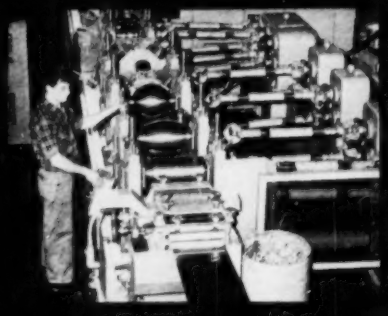
MARCH
1954

DIGEST

INTERNATIONAL BUSINESS AND INDUSTRY



MORE DOLLARS abroad means more benefits to both your country and the U.S. Incentives start the flow p11

AIR FREIGHT is growing. It's the answer when you are in a hurry to move your goods. And more people seem to be in a hurry p13

ALUMINUM TUBING is pouring out of a new high-speed mill. Your benefits: low-cost aluminum pipe and good physical properties p20

NEW TRUCKS for 1954 are on the market. You will find more power, more versatility, more ruggedness . . . p29

AUTOMATION on its engine-assembly line gives Curtiss-Wright greater output, lower costs p35

KENNETH C. TOWE leads American Cyanamid in the U.S. and abroad through a period of tremendous growth in the chemical industry p41

Greater sales were in the grasp of Marmite salesmen—if only the office staff could avoid a *figurework* bottleneck. *(The solution they found may help you)*

The bottle that BROKE its bottleneck...

POPULAR *Marmite Food Extract*, in its handy wide-mouthed jar, was in short supply for England's civilians until the war ended. Then ample raw material became available, an aggressive sales campaign was set—but another kind of bottleneck loomed.

"Could the office staff keep up with the greater volume of *figurework* necessary to plan advance production, distribution and meet expected sales demand?"

That kind of bottleneck could stop sales before they started. Marmite headquarters turned to Burroughs . . . asked for recommendations.

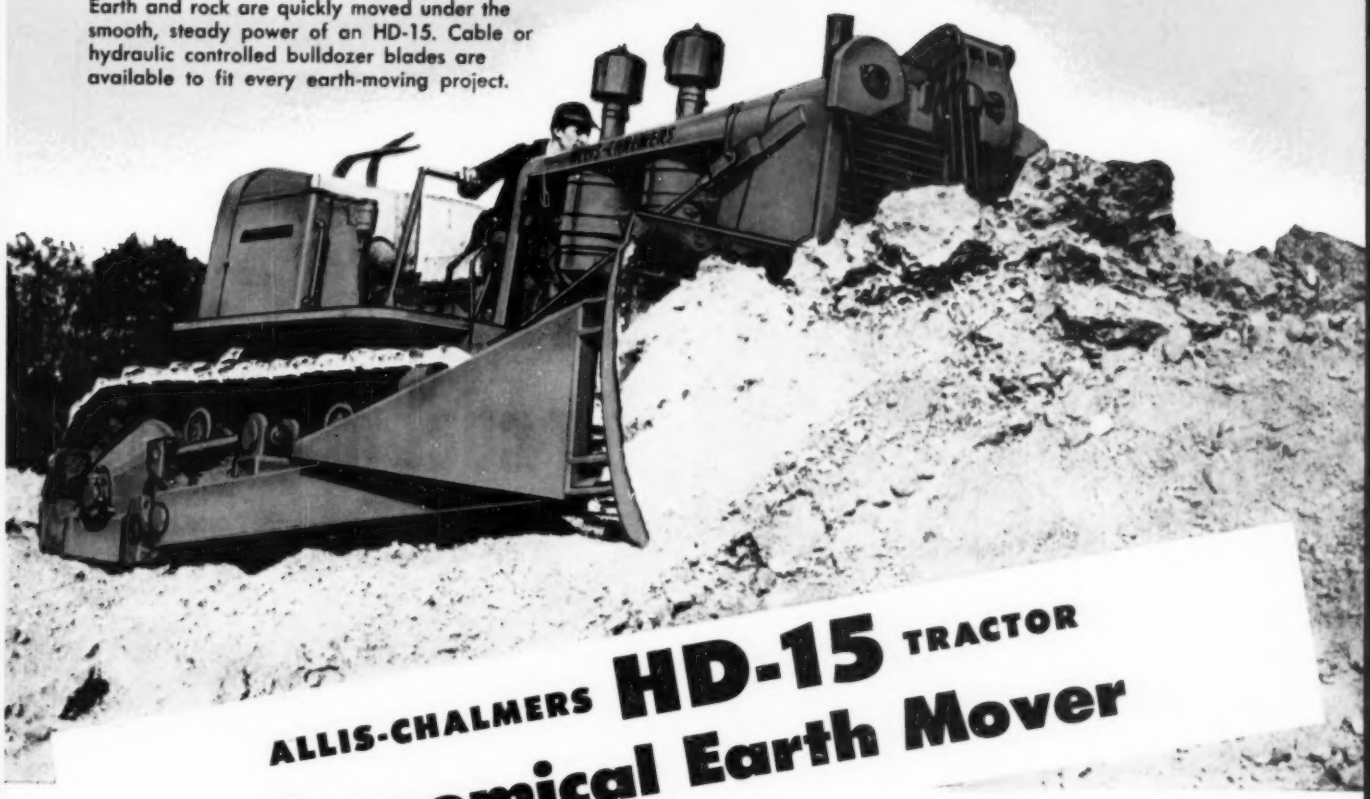
Result? After his investigation, the Burroughs man recommended the Burroughs Typewriter Accounting Machine *method*. Now, so smoothly and quickly do these Burroughs machines serve the company's offices that a fact-and-figure picture of the whole sales operation is *always on hand*. Details of sales in any kind of shop in any county are produced at a moment's notice—a great help in *advance* planning.

Can your business profit from faster facts? Your *local* Burroughs man offers expert advice on modern machine methods, expert service. Burroughs Corporation, Detroit 32, Michigan, U.S.A.

"They pay for themselves," says Marmite Food Extract Company Limited of London, referring to one of its Burroughs Typewriter Accounting Machines. *Another case where Burroughs means better business.*

Call your Burroughs man

Earth and rock are quickly moved under the smooth, steady power of an HD-15. Cable or hydraulic controlled bulldozer blades are available to fit every earth-moving project.



ALLIS-CHALMERS HD-15 TRACTOR
Economical Earth Mover

Modernization programs are reaching into many fields of world economy. New roads, dams, airports, schools, hospitals, and similar public projects are the key to greater national prosperity and better living.

Many contractors working on these heavy earth-moving projects are choosing the Allis-Chalmers HD-15 diesel crawler tractor because of its ability to do the work of heavier tractors, and because it can be purchased at a much lower price.

This modern tractor, one of four in the Allis-Chalmers line, has weight and ample reserve power for bulldozing work of the most difficult character, or to pull large scrapers . . . strength with a generous margin of safety. These advantages, plus easy operation and maneuverability, give the HD-15 exceptional productive capacity.

Efficient earth-handling equipment of this type speeds the completion of public tax-financed or private projects . . . assures the most economical administration of construction budgets.

HD-15 Features

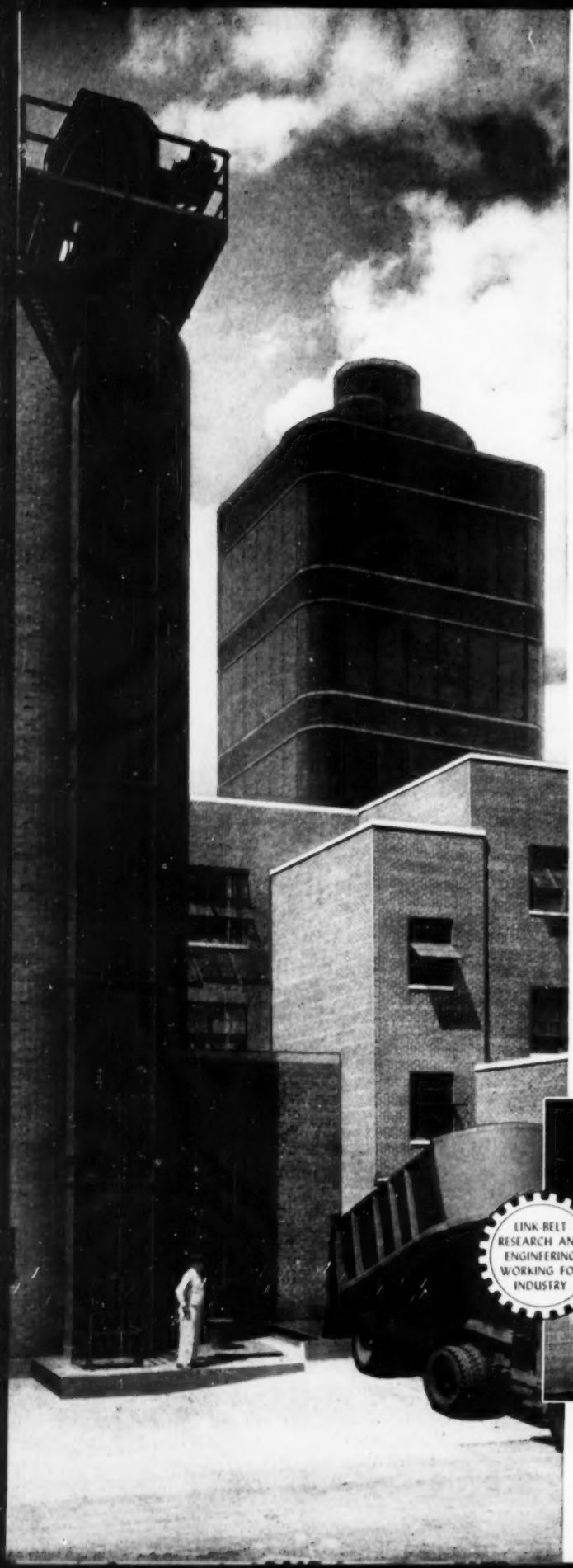
Weight, (bare) 27,850 lb. (12,633 kg)
109 drawbar hp.
Stability:

- Track tread, 74 in. (1.88m)
- Track length on ground, 8 ft. 5/16 in (2.45m)
- Ground pressure, 7.23 lb. per sq. in. (0.508 kg/cm²)

Unit construction
1,000-hour lubrication for truck wheels, idlers, rollers.
Hydraulic steering.

ALLIS-CHALMERS
DEPT. MH354 — TRACTOR DIVISION — MILWAUKEE 1, U.S.A.
BUILDERS OF MACHINERY SINCE 1847

LOADING SCRAPERS. Two HD-15's speed the loading of a scraper to heaping capacity. With more track on the ground, the HD-15 has greater stability and sure-footed traction in difficult terrain.



Express elevator for coal in a hurry!

Bucket elevators are just one of many Link-Belt products that help industry increase output, cut costs

LINK-BELT equipment—like this bucket elevator—provides dependable, low-cost coal handling in hundreds of power plants all over the country. Regardless of tonnage requirements, Link-Belt offers the right type and size of equipment to unload, store, reclaim and handle many materials with top efficiency.

And, as in so many fields, Link-Belt assumes complete responsibility for the entire installation—from planning to erection, if desired. Whether your job is large or small . . . moving materials or transmitting power—you are invited to investigate Link-Belt's total engineering facilities. Call your Link-Belt representative, or write us direct.

LINK-BELT

One source . . . one responsibility for materials handling and power transmission machinery

LINK-BELT COMPANY: Engineers • Manufacturers • Exporters of Machinery for Conveying Materials and Transmitting Power • Established 1875

EXPORT DIVISION: 2680 Woolworth Bldg., New York 7, U.S.A., Cable Address: Linkbelt—New York. Representatives listed on opposite page.

13,343-A

Another example of how Link-Belt contributes to everyday living: From S. C. Johnson & Son, Inc., Racine, Wis., wax products flow to homes everywhere. Photo at left shows bucket elevator at the Johnson power plant—part of their efficient Link-Belt-engineered coal handling system. Send for Book 2410, describing Link-Belt's range of services and products for modern power plants.

LINK-BELT

Representatives Throughout the World

Argentina—General Electric S.A., Buenos Aires and Rosario
Australia—Link-Belt Company Pty. Ltd., Marrickville • Malleable Castings Pty. Limited, Marrickville
Austria—Intropa Industrie-Und Handelsgesellschaft, M.B.H., Vienna 1
Belgium, Luxemburg & Belgian Congo—Fabricom, S.A., Brussels
Brazil—Cia. Importadora de Maquinas "Comac," Rio de Janeiro, Sao Paulo and Belo Horizonte • Figueras S/A Engenheiros & Importadores, Porto Alegre, Pelotas, Florianopolis and Cachoeira do Sul • Oscar Amorim, Comercio S/A., Recife and Natal
British Guiana—J. N. Harriman & Co., Ltd., Port-of-Spain, Trinidad, B.W.I.
Canada—Link-Belt Limited, Scarboro, Toronto, Montreal, Vancouver, Winnipeg, Swastika, Hamilton, Elmira, Halifax, Sydney
Canal Zone—Agencias Lumina, S. A., Panama
Chile—Gildemeister, S.A.C., Santiago, Coquimbo, Ovalle, Valparaiso, Concepcion, Victoria, Temuco, Valdivia, Rio Bueno, Osorno, Puerto Varas, Puerto Montt, Punta Arenas
China, Taiwan & Hong Kong—Li Ya Industrial Development Corp. (H.K.) Ltd., Hong Kong
Colombia—Tecnica Colombiana S.A., Bogota • Tecnica Medellin, Ltda., Medellin • Tecnica de Cali, Ltda., Cali • Tecnica Manizales, Ltda., Manizales • Tecnica Barranquilla, Ltda., Barranquilla • Tecnica Bucaramanga, Ltda., Bucaramanga
Costa Rica—Grace & Co. C.A., San Jose
Cuba—Woodward, Gilbert & Cia., Havana
Denmark—Hakon Gertsen, Copenhagen K
Dominican Republic and Haiti—F. A. Ortiz & Co., Inc., San Juan 5, Puerto Rico
Ecuador—Ferrum, S.A., Guayaquil & Quito
El Salvador—Grace & Co., San Salvador
England—Watveare Overseas, Ltd., Devonshire (Agricultural Chains only)
Finland—Industria Oyakeyhtio, Helsingfors
France—C. Comiot, Paris
Greece—Hellenic Tech. Supply Co., Athens
Guadeloupe, F.W.I.—Pierre Langlois Corp., Pointe-A-Pitre
Guatemala—Grace & Co., C.A., Guatemala
Hawaii—Honolulu Iron Works Co., Honolulu; Hilo Iron Works, Hilo
Iceland—Veismidjan Hedinn Ltd., Reykjavik
India—Kilburn & Co. Ltd., Calcutta, Bombay, New Delhi, Madras, Kanpur, Ahmedabad
Israel—Manfred Gottesmann, Tel Aviv
Italy—Trione Ricambi, S.p.A., Turin, Milan and Rome
Jamaica—Reginald Aitken Ltd., Kingston
Malaya—United Engineers, Ltd., Ipoh, Kuala Lumpur, Malacca, Seremban, Penang
Martinique—Maurice Hayot & Cie., Fort-de-France
Mexico—The General Supply Co. S.A., Mexico, D.F. • Gustavo Rodriguez, Monterrey, N.L.
Morocco, French & Tangier Zone—S.E.R.I.M.A., Casablanca, French Morocco
Netherlands—J. H. Kinman's Technische Handelmaatschappij, N. V., Rotterdam
New Zealand, Western Samoa, Fiji, and Tonga—Dominion Sales Corp. Ltd., Auckland, Wellington, Christchurch, Dunedin • Fletcher Holdings Limited, Auckland
Nicaragua—Grace & Co. C.A., Managua
Norway—Weihaven & Co. A/S., Oslo
Pakistan—Kilburn & Co. (Pakistan) Ltd., Karachi, Lahore and Chittagong
Panama—Agencias Lumina S.A., Panama
Paraguay—Sociedad Anonima Comercial Manuel Ferreira, Asuncion
Peru—Gross Equipment S.A., Lima, Arequipa, Chiclayo and Ica
Philippine Islands—The Earnshaws Docks & Honolulu Iron Works, Manila, Bacolod and Cebu
Portugal, Angola, Azores and Madeira Islands—Alfredo Alves & Ca. (Filhos), Lisbon and Oporto, Portugal
Puerto Rico and Virgin Islands—F. A. Ortiz & Co., Inc., San Juan 5, Puerto Rico
Singapore—United Engineers Ltd., Singapore
Spain, Canary & Balearic Islands, Spanish Morocco and Spanish Possessions in Africa—Eynos, S.A., Madrid, Spain
Surinam—N. V. Ingenieursbureau H. N. Van Dijk, Paramaribo and New Nickerie
Sweden—Aktiebolaget Fr. Ramstrom, Harnosand and Stockholm
Switzerland—Wilhelm Pluess, Zurich 1
Thailand (Siam)—International Engineering Co. Ltd., Bangkok
Trinidad, British Guiana, Barbados, Antigua, St. Kitts, Grenada, St. Vincent, St. Lucia, Tobago—J. N. Harriman & Co. Ltd., Port-of-Spain, Trinidad, B.W.I.
Union of South Africa, Southwest Africa, Northern Rhodesia, Southern Rhodesia, and Mozambique—Link-Belt Africa Limited, Springs, Transvaal • Edward L. Bateman Ltd., Johannesburg, Durban and Bulawayo, S. R.
Uruguay—General Electric S.A., Montevideo
Venezuela—Ortiz & Mejia C.A., Caracas

McGRAW-HILL
DIGEST

. . . the best from 48 business magazines—see p48

Volume 9 | March 1954 | Number 3

FEATURES

Dollar Investment Abroad 11
New Look for Air Freight 13
Forms Aluminum Pipe 20
Refines Copper and Zinc 23
Realism in Job Relations 26
What's New in 1954 Trucks 29
Manganese-Dioxide Process 32
Automated Engine Assembly 35
Chemicals in World Trade 41

AVIATION, TRANSPORTATION
Hourglass Axle Bearings 23
1,200-Mph. Plane Ordered 33
Makes Cars Run Better 34

CHEMISTRY, METALLURGY
Dry Salt with Less Fuel 19
Phenolic-Foam Applications 27
Fine-Particle Silicas 33

CONSTRUCTION
New Backfilling Method 17
Wire Reinforces Asphalt 21
Erects Factory Quickly 28

ELECTRICITY, POWER
Concrete Poles Substitute for Wood . . . 17
Pumped-Storage Plant 27
Clean Exhaust 39

ELECTRONICS
New-Type Transistor 17
Industrial Computer 26
Pictures Recorded on Tape 27

FOOD PROCESSING
Juice Loses No Flavor 17
Increase Filling-Line Capacity 19
Faster Cooking 31

METALWORKING
Improves Part Quality 21
New Uses for Ceramics 27
Air Aids in Strip Mill 28

MINING, PETROLEUM
Mine Ships Bauxite 16
Uses Cyclic Regeneration 22
Sulfur from Coal 31

PLANT MANAGEMENT
Photos Speed Reassembly 21
Paint Improves Housekeeping 31
Why Research? 44

TEXTILES
Replaces Skein Dyeing 17
Synthetics in New Fields 22
Carding Unit Uses Sliver 38

DEPARTMENTS

Business Trends 7
Washington Report 9
This Month's How To 19
Technical Shorts 31
New Products 36
Management Report 45
Production Ideas 46

Harry S. Wharen, *Editor* | **Joseph A. Cohn**, *Associate Editor* | **Arthur H. Luse**, *Associate Editor* | **W. Howe Sadler**, *Publications Manager*

J. K. Van Denburg, Jr., *Editor, World News* | **George B. Bryant, Jr.**, *Washington Bureau* | **Boyd France**, *Washington Bureau*

March 1954 | McGRAW-HILL DIGEST | Vol. 9—No. 3

Member – Audit Bureau of Circulations

Published monthly by McGraw-Hill International Corporation for circulation in all countries of the world except the United States and Canada. *Publication office:* 99-129 North Broadway, Albany 1, N.Y., U.S.A. *Executive and editorial offices:* 330 West 42nd St., New York 36, N.Y., U.S.A. Donald C. McGraw, Chairman of the Board; Willard T. Chevalier, President; Eugene P. Warner, Senior Vice-President; Joseph A. Gerardi, Treasurer; John C. Cooke, Secretary; J. C. Stark, Vice-President Publications Division; K. Presbrey Bliss, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Director of Circulation.

Subscriptions may be ordered through Director of Circulation, through local book dealer, or McGraw-Hill Publishing Co., Ltd., McGraw-Hill House, 95 Farringdon St., London, E.C. 4 (British only). Subscription rates: $5 for 1 year, $8 for 2 years, or $10 for 3 years; single copy 50¢ (U.S. currency). Entered as second-class matter January 1, 1953, at the post office at Albany, N. Y., under the Act of March 3, 1879.

Copyright, 1954 by McGraw Hill International Corporation, 330 West 42nd Street, New York 36, New York. Reproduction of items in full or part without written permission prohibited in all parts of the world.

SPARROWS POINT U.S.A.

Bethlehem's great Sparrows Point plant in the Port of Baltimore is the world's largest steel-producing plant located on tidewater. Products for export can be loaded at this plant directly aboard steamers, thereby minimizing the possibility of damage by reducing the handling required. Bethlehem Steel Export Corporation, 25 Broadway, New York 4, U. S. A. Cables: "BETHLEHEM, NEWYORK."

BETHLEHEM STEEL

Offices and representatives in all principal cities of the world

805E

For HYDRAULIC presses, too . . .
it pays to specify BLISS

New BLISS HYDRO-DYNAMIC PRESS

helps Ford form 1000 different wing parts

Four die slides and a choice of any pressure up to 5000 tons give short run versatility

High pressures and short runs are typical requirements of modern aircraft production. To meet these needs during World War II, Bliss developed special rubber pad forming presses. Now pressure requirements are higher still. The Ford Motor Company's new Hydro-Dynamic press has *5000 tons capacity*. And it produces over 1000 different wing parts at Ford's Kansas City plant.

Here's how it works: While one die slide is in the press, blanks are set up or dies changed on the other three. Slides can then be fed to the press in any sequence; operators at each of the die slide tables can select any pressure required up to 5000 tons; and, of course, the rubber pad forming techniques keep tooling costs down.

Like this Ford installation, many Hydro-Dynamic presses are engineered for special-purpose use. But also available are standard Hydro-Dynamic presses designed to meet the more common production problems. Both types are described in Catalog 30-A which is yours for the asking.

Simply write or wire address below.

RUBBER PAD FORMING *of small aircraft parts, in comparatively short runs, has reduced tooling expenses, cut preproduction time and is generally less costly than conventional drop hammer methods. Bliss press engineers helped pioneer the development during World War II.*

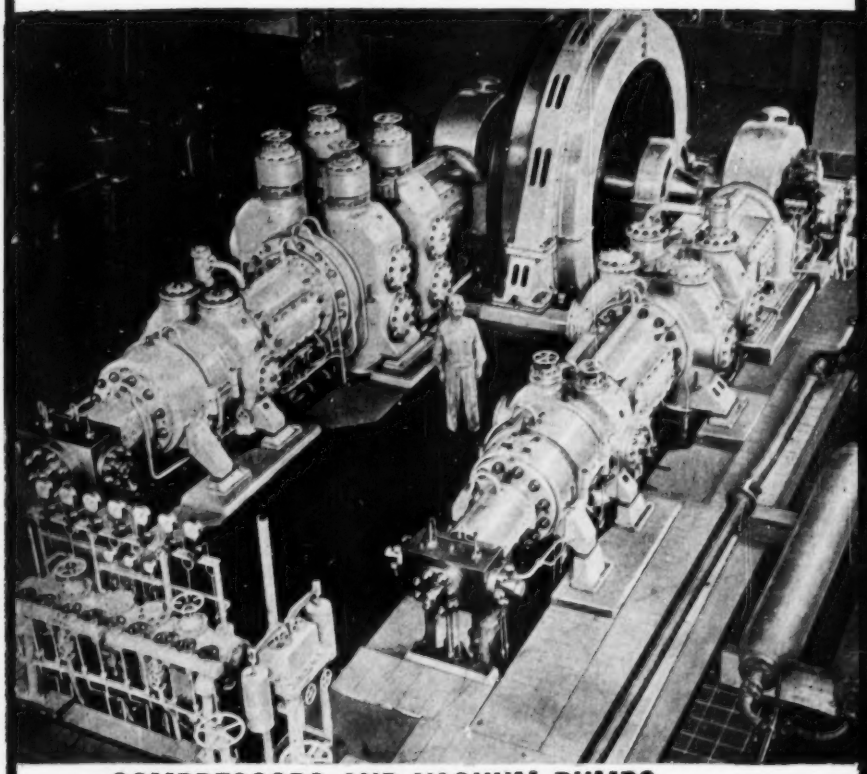
BLISS on your press is more than a name . . . it's a *guarantee*

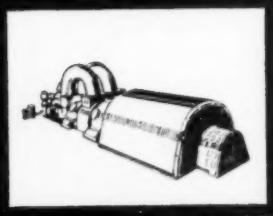
E. W. BLISS COMPANY Canton, Ohio, U.S.A.

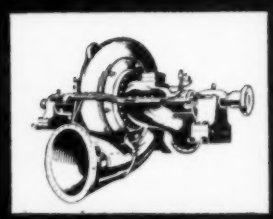
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

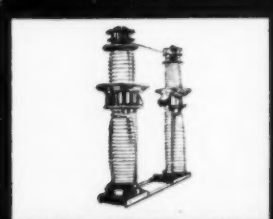
E. W. Bliss (England) Ltd., Derby, England—E. W. Bliss Company (Paris), St. Ouen sur Seine, Paris, France

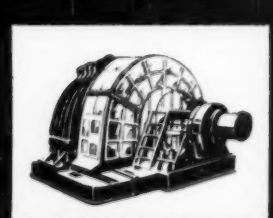
The Results of half a century of Experience











COMPRESSORS AND VACUUM PUMPS
of Impeccable Reliability and Performance

For several decades, the superiority of Hitachi's design has been proven by their outstanding performance, long life, satisfactory operation, and minimized maintenance.

Specially engineered to every industry's requirements, they are now available in a wide variety of capacity and type ranging from fractional horsepower baby compressors to high pressure gas compressors employing several thousand horsepower drive.

Hitachi, Ltd.

Tokyo Japan

New Marunouchi Building, 4, 1-chome, Marunouchi, Chiyoda-ku, Tokyo

BUSINESS TRENDS

U. S. BUSINESS experts are less pessimistic over 1954 sales than they were at year end. Anticipated sales of a cross-section of the nation's largest retail stores indicate a 4% sales drop in the first 6 months. A second-half rebound will offset most of the earlier loss. For all stores, 1953 sales advanced 5%. Heavy buying during Christmas week pushed up sales to within 2% of 1952.

Government promises to insure this trend. In his state of the Union message, President Eisenhower declared that the "Federal budget should be a stabilizing factor in the economy." To prevent recession, Government has mapped a definite line of attack: it will manipulate money, credit and manpower.

Prof. N. L. Woytinsky of John Hopkins stated at a National Industrial Board Conference, "By the fall of 1954, national incomes and production are likely to return to the. . . . gains of 3½ to 4½%, which would put the economy some 7 to 8% above the level in the fall of 1952." As if to substantiate this estimate, General Motors announced that it will spend $1-billion on plant expansion in 1954.

U. S. TRAVEL ABROAD will break records in 1954. Last year 800,000 U. S. citizens vacationed abroad. They spent more than $1-billion, making tourism one of the world's largest dollar earners.

A U. S. travel commission will be set up if recent legislation introduced in Congress is approved. The aim is to expand tourism to $2.5-billion annually. To encourage travel of Americans abroad reduction of transportation costs and hotel rates will be suggested. The commission would also study ways to encourage foreign travel in the U. S.

Commission or no commission, leading U. S. tourist agencies report tourist class bookings to Europe for June, July, and August are sold out. Transatlantic airlines will add about 50% more flights beginning this spring. Here is the picture:

- **England:** The British Treasury collected some $100.8-million from U. S. visitor purchases in 1953 or more than $5-million more than that earned by its best export group, the vehicle industry. It expects to have little trouble in bettering that record in 1954.
- **France:** Despite grumbling about high French prices (this has been an annual affair since 1945) more U. S. tourists than ever have already made reservations to visit France this year.
- **Italy:** Rome and Venice will attract almost as many tourists as Paris in 1953. Low costs for transportation, hotel rooms and merchandise are important factors in pulling more tourists in.

EAST-WEST TRADE continues (McG-H Digest, Dec '53, p13) to occupy Western businessmen and officials alike. Gunnar Myrdal, executive secretary for the Economic Commission for Europe, will visit Moscow in the near future. Mr. Myrdal is known as a man who wastes no time in vague discussions: he has stated in the past that he would talk to the Russians only when they evinced desire to do business. Meetings have been arranged with Soviet officials concerned with trade in steel, coal, power, housing.

Danish economic experts regard future trading with the Soviet Union as a bright spot in a generally unfavorable outlook for Danish foreign trade. A recent Russo-Danish trade agreement gave Danish food industries big orders for butter and fish. In an effort to squeeze out American and British oil companies, Moscow has offered the Danes oil and gasoline. Soviet oil sales will go to France under a recent Franco-Russian agreement providing for delivery of 10,000 tons monthly.

Soviet bids for U. S. butter are apparently off, according to U. S. Secretary of Commerce Weeks. Although Denmark had privately informed Washington that it would not object, the deal ran into opposition from business and public alike. Principal reason given, however, was the Russian refusal to pay Commodity Credit Corporation purchase price of $.65 a lb. Russia's price was $.45 a lb., which would mean that the U. S. actually would have to subsidize the purchase.

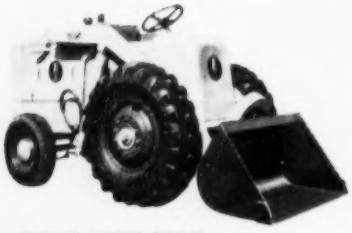
CONVERTIBILITY is now being advocated on both sides of the Atlantic. With the recent gains in European economic and financial progress (gold and dollar reserves were estimated at $9.1-billion at year end—$2.3-billion over 1952, Washington officials expect European governments to move to end currency controls in the near future.

U. S. officials would also like some action. (See p9). However, they envisage "limited" convertibility only, primarily limited to current trade transactions. They have no intention of backing full convertibility by proposing multi-billion dollar stabilization funds to Congress.

PAYLOADER® TRACTOR SHOVELS

A Versatile Material-Handling Method

SIZES AND TYPES FOR EVERY TASK

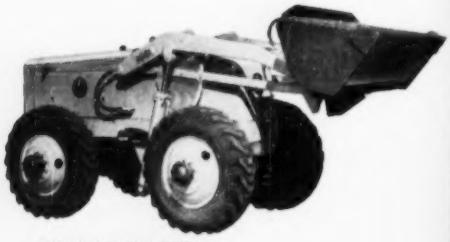


FRONT WHEEL DRIVE
REAR WHEEL STEER

Models available with 12 cu. ft. and ½ cu. yd. bucket capacity. Especially suitable for handling loose materials and for maximum maneuverability.

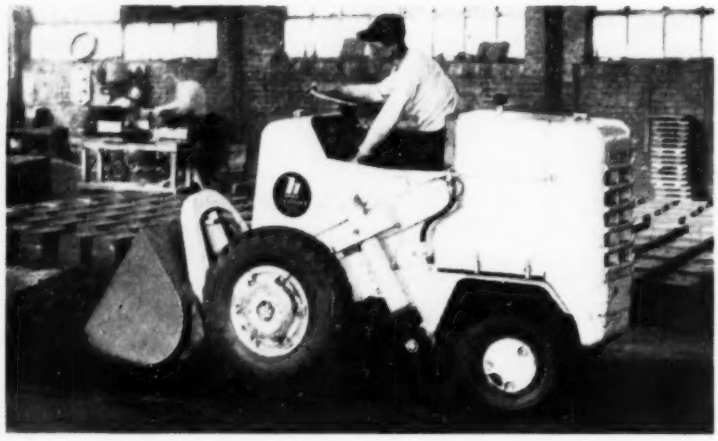
REAR-WHEEL DRIVE
FRONT-WHEEL STEER

Three models available from ¾ to 1⅛ cu. yd. bucket capacity; gas or diesel power; four speeds in each direction. For all-around use, including digging operations.



FOUR WHEEL DRIVE
REAR-WHEEL STEER

Two Models available — 1 and 1½ cu. yd. bucket capacity. Gas or diesel power; four speeds in each direction, plus torque converter. Big pneumatic tires and drive on all wheels provides traction and power for severe conditions.



Thousands of "PAYLOADER" Tractor-Shovels are serving industry and construction, handling earth and all kinds of bulk or loose materials. Their unusual mobility and versatility enables them to do many jobs formerly accomplished by slow, laborious methods.

"PAYLOADERS" also eliminate the need for expensive specialized equipment in many instances, because they can do so many tasks — dig, shovel, carry, load, dump and spread bulk materials . . . push, pull and lift other loads. Big pneumatic tires provide ample traction and flotation for work on unpaved ground; multiple speeds in reverse, as well as forward, insure fast maneuvering and high production.

"PAYLOADERS" are distributed by International Harvester Export Company and its dealers throughout the free world. The Frank G. Hough Co., 923 Sunnyside Avenue, Libertyville, Illinois, U.S.A.

"SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

WASHINGTON REPORT

REPUBLICAN ADMINISTRATION will push ahead with the internationalist foreign-economic policy which the Republican party denounced during 20 years of Democratic rule. That is the basic significance of the Randall Commission Report, which will become administration policy.

The stability and continuity given to U.S. foreign economic policy by the report will be as important in the long run as the immediate practical impact. Foreign governments, traders, and businessmen now can plan ahead with some certainty that the administration's policy is towards lower trade barriers, higher foreign investment, closer international economic cooperation.

The report is no blueprint for Utopia. It will not begin to solve the basic malajustments that are keeping the free-world economy tottering unsteadily, even if it is fully implemented by Congress. But the proposals would lead to a steady increase in U.S. imports and in American investment abroad.

U.S. monetary experts feel that the new U.S. policy will make possible within a year convertibility of key European currencies on current account plus some relaxation of trade restrictions. Relaxation of International Monetary Fund rules on use of its funds to back convertibility has largely taken place. It will be pushed farther.

Many of the important Randall recommendations will be implemented this year. Some will go into effect without congressional action.

Randall recommended in effect repeal of the Buy-American laws by executive order pending their amendment by Congress. This will be done. That will force Congress to enact new legislation or let Buy-American wither away. The Randall Commission proposes amending the law to permit foreign concerns to bid for government contracts on an equal basis if their countries grant reciprocal treatment to U.S. bidders. The net effect will be more U.S. Government purchases abroad.

The proposal that the Federal Reserve System extend lines of credit to foreign governments to back convertibility of their currencies also can be implemented without congressional action. The Federal Reserve is reliably reported ready to do this up to a limit of $2- or $3-billion under suitable conditions. Lending policies of the Export-Import Bank for foreign development also will be liberalized along the lines suggested by the Randall Commission.

Congress will go along with some increase in tax incentives for foreign investors. There will be a fight over extending government guarantees to cover investment loss due to war or revolution. But continued guarantees against loss through inconvertibility of currencies will be approved by Congress.

Some additional customs simplification will pass Congress this year. The base for calculating tariff duties probably will be changed from "foreign value" to "export value." This would reduce sharply the risks of exporting to the U.S. and cut the number of cases coming before tariff courts in half. Simplification of tariff classifications and rate structure will be harder to get by Congress.

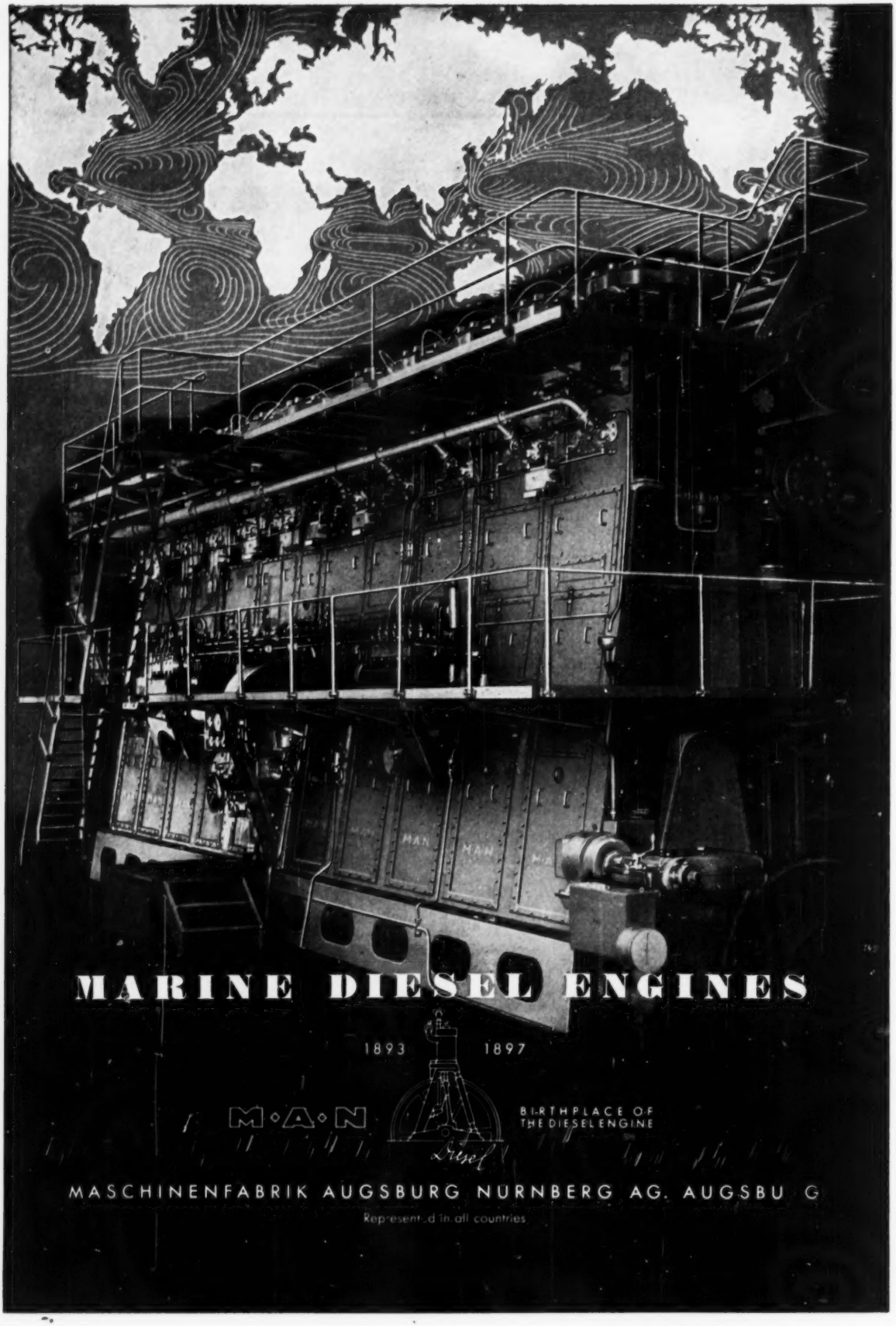
The big fight in Congress will be over Randall's recommendation for renewal of the Reciprocal Trade Act with additional tariff cutting authority for the President. Senator Eugene Millikin and Representatives Daniel Reed and Richard Simpson dissented from this section of the report. They will use their key positions to block it.

But the administration will exert strong pressure to get the measure through. This still may weaken Millikin's opposition. Reenactment of the trade bill for 3 years is almost certain.

Randall asked for three kinds of new tariff cutting authority for the President. He could reduce all tariffs 15% below present rates over a period of 3 years in exchange for reciprocal concessions. This would bring most duty rates 65% below 1945 levels. He could cut rates on commodities not being imported into the U.S., in substantial volume, 50% below 1945 levels unilaterally without reciprocal concessions. He could reduce unilaterally any rates above 50% ad valorem to this ceiling.

Biggest disappointment to the freer-trade advocates was the recommended retention of the "peril-point" and "escape-clause" provisions of the trade agreements act. This was done in a vain attempt to secure Senator Millikin's support. These provisions have been a major source of uncertainty to exporters trying to invade the American market.

But the Randall Commission did recommend giving the President power to over-ride Tariff-Commission findings in peril-point and escape-clause cases if he found it in the national interest to do so. This would give him more leeway to reduce tariffs and make it harder for domestic industries competing with imports to get tariff relief.


MARINE DIESEL ENGINES
1893 1897
M·A·N
BIRTHPLACE OF THE DIESEL ENGINE
Diesel
MASCHINENFABRIK AUGSBURG NURNBERG AG. AUGSBU G
Represented in all countries

MARCH 1954
VOLUME 9 • NUMBER 3

McGRAW-HILL
DIGEST

American ingenuity in developing equipment and ideas encourages movement of . . .

Dollar Investment Abroad

Both your country and the U. S. can benefit from the flow of investment dollars abroad, but they will not come unless welcomed. Investment is a two-way job.—An original Digest article

A MILLION ACRES of tropical Peruvian forest will soon provide model farms for the natives of the upper Amazon basin. The dream of R. G. LeTourneau of Longview, Texas, this is a unique example of U. S. foreign investment. It demonstrates what can be accomplished when investor and foreign country approach their problems with mutual understanding and imagination.

The agreement, between the Peruvian government and R. G. LeTourneau, Inc., calls for the construction of an oil-surfaced, 50-km. highway in the regions west of the Pachitea and Ucayali Rivers in eastern Peru. LeTourneau will be paid for the construction of the highway and related public works in the form of a land grant of approximately 1-million acres of Peruvian forest.

A preliminary $2-million will be invested during the first 2 years of operation. A rubber-tired, trackless, diesel-engine train, designed specifically for such jobs by Mr. LeTourneau, will operate on the highway.

The following obligations have been assumed by LeTourneau. The colonization area will be divided into lots of 10 hectares (24 acres); colonization preferences will go to nationals; experimental programs in agriculture, cattle, and forestry will be undertaken; hospitals and schools will be provided.

A good example of capital investment supported by American "know-how," this project demonstrates the value of:

1. Investment based on thorough evaluation of the risks involved.
2. Cooperation of the foreign government in reducing risk factors.

These factors are important to the encouragement of international private investment, particularly American. A quick reference to international capital movements in the prewar period shows why.

In the 1920's, foreign investment performed its normal function of providing both long-term and short-term capital in the world's money markets. For example, the value of U. S. direct investment abroad in 1929 totaled $7.5-billion. And during the period 1920-31, $7.8-billion in foreign bonds were issued in the U. S., 40% of which went to Europe, 27% to Canada, and 22%

"Success will depend primarily on the willingness . . . to cooperate."

to the Latin American countries.

With the Great Depression, all was changed. Defaults, the drop in national incomes of creditors, preoccupation with balancing national budgets, high taxes and restrictions on capital movements, all combined to curtail severely the flow of capital.

On balance, the U. S. even became an investor of long-term capital. New portfolio investment from 1932 to 1939 in all totaled only $194-million. The international nature of capital markets was largely destroyed.

The obstacles confronting international capital movements mounted still higher during the postwar period because of (1) the lack of foreign dollar credits, (2) rising nationalism and (3) the more favorable climate for domestic private investment created by the phenomenal expansion of the U. S. economy. Thus, the international nature of foreign capital markets had not only been destroyed, but also the economic structure upon which those markets were based.

The trends of American foreign investment from 1945 to 1950 reflect this change. Of the total increase of $3.9-billion in direct investments abroad in this period, petroleum investments accounted for 50% and manufacturing for 40%. But the bulk of this investment capital was obtained from undistributed profits of the parent companies.

Furthermore, investments tended to be made where they had already been made in the past. In contrast, portfolio investment, which constitutes the most convenient means of tapping the capital of the small private investor and which made up 60% of the capital outflow in 1929, was almost non-existent.

The principal problem, then, of postwar international investment has not been the restoration of prewar economic and political conditions favorable to such investment. Instead, it has been the creation of new conditions, based on fundamental principles of finance, tailored to suit this "new look" of present world economic and political conditions.

The solutions offered to these vexing problems of international investment have been as varied as the problem themselves. They have been proposed on both an international and national scale.

One of the earliest and most important studies by an international organization was published in 1950 by the Organization for European Economic Cooperation. Its recommendations were basic. Its proposals were broken down into action required of both participating countries and lending countries:

1. Regulations necessary for the establishment of subsidiary companies or branches should be simplified. For this simplification, governments might set up special offices to deal promptly with the problems of potential investors.

2. Short and authoritative statements should be published periodically by the participating governments stating their attitude toward foreign investment.

3. Currency controls should be relaxed to the greatest extent possible to permit remittance of dividends and capital profits. In the special case of portfolio investment, the removal of limitations on the transferability of securities and of interest payments by residents would help revive international capital markets.

The most important actions that can be taken by lending countries involves debt repayment and taxation. The OEEC report sums up the repayment problem when it says, "It is essential that the trade policies followed by lending countries be such that debtors can repay their obligations, that is, that the way is made as easy as possible for debtor countries to expand their earnings of currencies acceptable to their creditors."

Since the appearance of the OEEC report, the difficulties confronting foreign investors have become recognized here and abroad. The Eisenhower administration has officially encouraged the out-flow of American capital under its "Trade, not Aid" program.

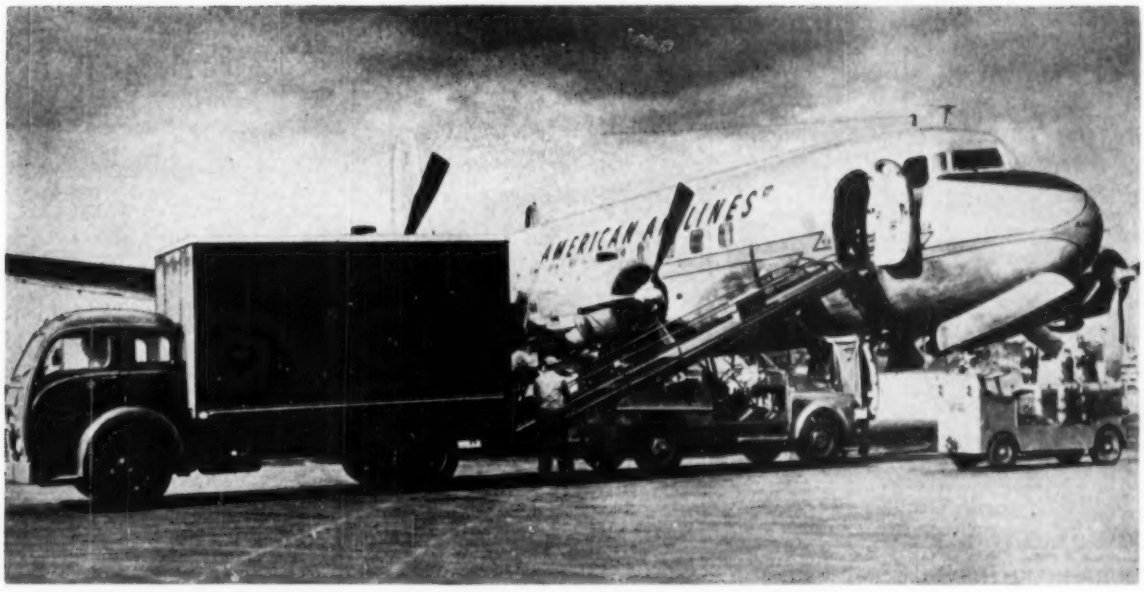
Practically all the official U. S. commissions on foreign trade under the previous and present administrations have made some sort of recommendations on foreign investment. The latest, the Randall Commission, recommended federal insurance for overseas investors. It is to be noted, however, that investment guarantees under the Mutual Security Administration accomplished little toward spurring U. S. investment abroad.

U. S. investors are apparently more interested in favorable investment conditions abroad than guarantees by their governments. The recent extensive tour of South America by Dr. Milton Eisenhower, brother of President Eisenhower, probably did more in this respect to create an atmosphere of mutual understanding toward American capital ventures in the South American republics than all the past guarantee programs and bilateral trade agreements together.

Many governments are seriously laying their own plans for enticing U. S. investors. Turkey, for example, passed a "Law for the Encouragement of Foreign Capital Investments" in 1951 to permit the transfer of earnings up to 10%. This law was considered only moderately successful in attracting foreign capital (a total of $5,760,000 was registered at the end of 1952). A new law passed last December now removes virtually all restrictions on the transfer of earnings.

Other countries, such as Australia, Peru, Venezuela, have adopted or are adopting measures to attract the capital of foreign investors.

But whatever the solutions proposed toward increasing the flow of foreign investment into those areas where it is sorely needed, their success will depend primarily on the willingness of both investor and foreign government to cooperate in reducing the factors of risk as well as those ever prevalent non-financial obstacles.



Truck and aircraft team up for a speedy delivery of goods as part of the . . .

New Look for Air Freight

In a world that is beginning to think more in terms of speed, the air-freight business is assured of its place as growth-industry leader. But some changes are yet to come.—An original Digest article

A SMASHED TURBINE ROTOR can keep a ship in port for days waiting for repairs. Each day could mean thousands of dollars lost for the owners. It happened to an Argentine ship laid up in Durban, Africa. What could have been an unhappy situation was solved by air freight.

Phone calls to International General Electric Co. in Argentina and New York established the kind of replacement equipment needed. By the time IGE had coordinated the necessary export licenses and financial details, the equipment was boxed ready for shipment. A Slick Airways airplane, specially chartered, stood by for the flight and a direct New York-to-Durban shipment was soon on its way.

The air-freight industry got its biggest boost after World War II. Two factors were significant:

- Both highly-trained pilots and cargo aircraft were surplus commodities.
- International action opened air lanes to commercial traffic.

It was only logical that pilots and aircraft would get together to provide fast efficient service to people who were in a hurry to get their goods moved.

But U. S. airline development in the international air-freight field has been spotty. Certification of the air-cargo routes went to scheduled U. S. carriers. However, they did not maintain the initiative and now air cargo carried by foreign lines far exceeds that carried by U. S. lines.

The non-scheduled lines are battling for certification. Latest developments indicate that at least one line, Seaboard and Western Airlines, will get its certification. The non-scheduled lines argument is this: only all-freight airplanes can fulfill the demands of a developing air-cargo industry. Combination passenger and cargo planes, with rigid schedules, leave the international air-freight shipper in an unfavorable position. He must conform to fixed flight schedules, is limited as to the type of shipment that can be carried in the available space, and, in addition, runs the risk of having his freight loaded in small units if there is any space available at all.

Rate levels are also under fire in the industry. Most shippers agree that much more use would be made of air freight if they were offered lower rates. One industry spokesman says annual volume of air freight would be more than 650-million lb. if rates were fixed on an economical and competitive basis.

Pan American Airways has pro-

TURBINE ROTOR begins a 9,000-mile trip from New York to Durban, Africa, where a ship in trouble waits for it

posed a 45% rate cut for shipments over 1,100 lb. Such a reduction would go a long way in regaining some of the cargo volume now carried by foreign lines. More aggressive selling on the part of Pan American and other U. S. lines, together with certification of some of the non-scheduled freight carriers, will offer definite competition to the foreign carriers that now dominate the trans-Atlantic air-cargo field.

Goods shipped air freight vary considerably. British Overseas Airways Corp. says every ninth passenger it carries is four-legged. In fact, BOAC provides its staff with a special booklet to guide them in transporting animals.

Virtually all watches imported into the U. S. come by air. Ostrich feathers are regular air cargo from Johannesburg to London and Sydney.

Flowers sent by air are no novelty. Actually, air-freight possibilities put British orchid growers on their feet. Cargo aircraft opened the whole world as a market for the growers.

Major items that come into the U. S. via air freight include woolen apparel, hand tools, optical instruments, precious metals, toys, watches, and spirits. Percentage volume shipped by air varies—from 100% for watches to 1% for spirits. In general, many imports come into the U. S. by air—at least occasionally. But regular import is limited to those items that have either a high profit margin or value depending on their timeliness.

Watches appear to be the perfect commodity for air shipment. Their high value, slight weight, and limited bulk virtually demand air import. With all factors taken into account, the air rate for shipment of watches is only slightly higher by air than by sea.

Items going the other way across the Atlantic include vehicle parts, newspapers and periodicals, portable power tools, plastic articles, films, nylon stockings, cosmetics, cutlery, typewriters and accounting machinery, and scientific instruments. Biggest volume item in the group is films—90% go by air. Aside from films, newspapers and periodicals, the other commodities listed are shipped air freight rather infrequently. Generally, the reason for air shipment of these items is either that an emergency exists or sample goods are wanted quickly.

Most cargo handling is carried out by the air-freight forwarder. What he has to offer the shipper is a service based on coordination and flexibility. Both forwarders and airlines are carriers. But forwarders differ in this respect: they do not operate aircraft. Their function is to consolidate loads into economic units and to coordinate ground transportation with air schedules. One advantage they have over airlines is that they escape the economic necessity for arranging return loads.

The certificated airlines have bitterly opposed the air-freight forwarders for several reasons:

- The forwarders have supported the all-cargo lines in their fight for certification.
- Forwarders solicit freight in competition with the scheduled airlines. Resulting freight is often turned over to the cargo lines for handling.
- Forwarders, handling freight on a consolidation basis, dump loads on the scheduled airlines during the peak rush hours. That adds to the airlines troubles.

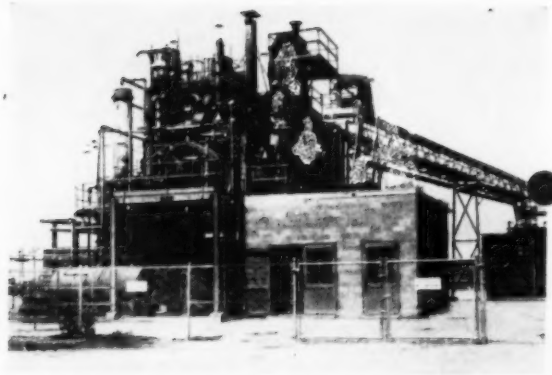
Despite the certificated airlines objections, air-freight forwarders will remain a permanent fixture in the air-freight industry. They provide the two essentials to speedy, efficient freight handling—coordination and flexibility. For the shipper it means better service and lower costs.

Britain employs an effective device that brings together carrier and shipper. It's called the Baltic Air Exchange. Speed is a key factor in its operation. In one case a cargo of machinery was on its way overseas within 4 hr.

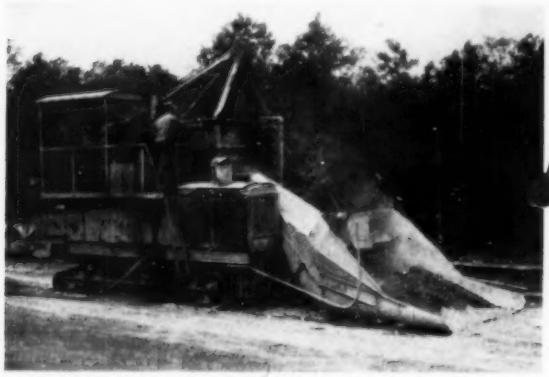
Represented on the market are some 50 of the principal United Kingdom and foreign owners, including BOAC, British European Airways, Sabena Belgian Airlines, KLM Royal Dutch Airlines, Air France, and Air India.

Much of the commercial chartering of British independent companies is done through the Airbrokers' Association, which promotes the Baltic Air Exchange. Members feel that business now is limited only by the shortage of suitable long-distance, high-capacity freighters. As new cargo craft go into operation, the brokers expect costs to drop spectacularly, thus attracting more business.

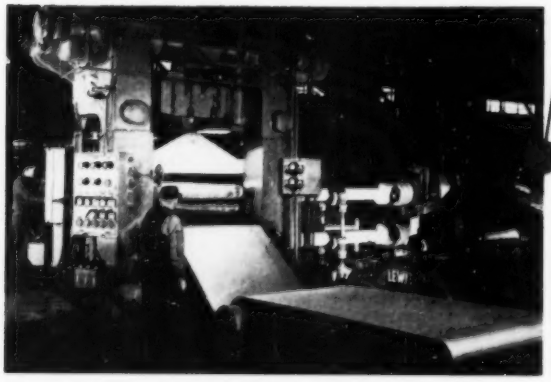
Despite the name "Baltic," the exchange is far from regional. Much of the work it originates



• Complete plants and equipment for the chemical industry



• Paving equipment for the construction industry



• Rolls and rolling mill equipment for the steel and non-ferrous industries

In processing chemicals, oils and food—in rolling ferrous and non-ferrous metals—in constructing highways, tunnels and airfields—and in other basic industries—Blaw-Knox engineering know-how and engineered products have contributed to industrial progress and development the world over.

To make these same facilities and products available to you, just write or wire our Export Department.

BLAW-KNOX COMPANY PITTSBURGH, PENNSYLVANIA, U. S. A.

ADDRESS—EXPORT DEPARTMENT
CHRYSLER BUILDING, 405 LEXINGTON AVE., NEW YORK 17, N.Y.
CABLE ADDRESS: BLAWKNOX, N. Y.

BLAW-KNOX

Basic Products for Industry: complete chemical and processing plants • chemical and food processing equipment • rolling mills and auxiliary machinery • rolls for steel and non-ferrous mills • open hearth furnace equipment • heavy steel castings • heat and corrosion resisting alloy castings • contractors equipment • concrete and asphalt road paving machinery • steel forms for concrete construction • clamshell buckets • prefabricated piping systems • open steel grating • sprinkler systems for fire protection

is in countries remote from Europe, involving foreign aircraft covering routes that never touch on England at all.

Until recently, the most rapidly growing type of business had been in the carriage of seamen and ships' spares. Now, increasing interest is being taken in general cargo, and many inquiries are being made by exporters. So, the future looks bright.

Also, independent operators can now apply to operate new routes. Operators will be granted licenses to maintain scheduled services for 7 to 10 years, thus enabling them to plan ahead with confidence and to attract badly needed additional capital to the industry.

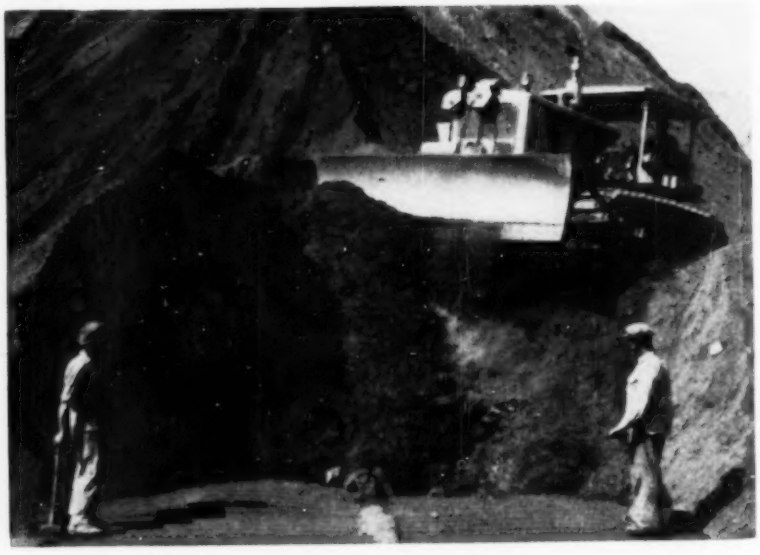
Independent operators are already making a sizeable contribution to the total capacity of Britain's merchant air service. As the new and larger aircraft come into commission, they expect to broaden their activities, particularly in new areas and difficult territories.

Britain's exporters, who today are among the most air-minded in the world, are being backed up by air-freight facilities that enable them to build up new overseas business. Regularity of Britain's freight services is encouraging a new type of shopkeeping overseas. A hat shop can confidently be opened in, say, Dares-Salaam, Tanganyika, with only a few models, in the confidence that replacements or enlargements of stock can be obtained in a matter of days from England.

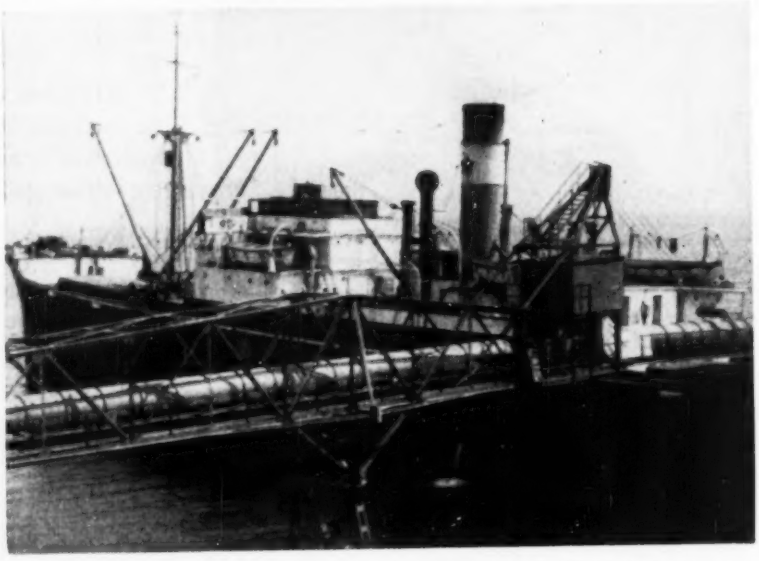
For the future, the air-freight business will keep growing—especially if rates are economically and competively based as seems likely. Freight operations will be separated from passenger services. But the latter will still carry a considerable volume of freight. New aircraft, capable of carrying 20 or 30 tons of cargo, will be specially designed for both long- and short-haul operations. And they will do all this at a fraction of present air-cargo rates.

You will see a cut in subsidies and new operators entering the competition on the world's international air routes. The scheduled airlines will be so busy developing their own specialized type of traffic that they will be less concerned about the activities of non-scheduled operators. In such an atmosphere the number of aircraft engaged purely on non-scheduled operations will increase. In short, the air-freight industry can look forward to long-term growth in the world's business picture.

Modernized Mine in Greece . . .



. . . Ships Bauxite to West Germany



A three-nation parlay of money, mines, and metalworking plants is producing aluminum for the West. Key to the arrangement is the newly modernized Eleusis Bauxite Mines in Greece. Bauxite is being shipped now —at a 1,000-ton-a-day rate—to West Germany for smelting into aluminum ingot. Until a year ago, Eleusis was strictly a pick-and-shovel operation. Then, with $1.5-million in U. S. aid, Eleusis was able to buy German, Canadian, Greek, and U. S. equipment for a complete face lifting. In the top picture, bulldozers push bauxite over a grill; the ore drops through onto two belt conveyors that carry it to shoreside. Below, a Yugoslav ship takes on ore through a German-built, ship-to-shore conveyor bridge. Conveyor is housed in a pipe. —Business Wk, Dec 5, p142

Package Dyeing Replaces Skein Dyeing Gradually

Some new developments in winding woolen and worsted yarns for dyeing have appeared. Here is a review:

• **Uniformity in winding** is stressed more than tension. A medium and uniform yarn tension in winding gives the best results for even dyeing. A fairly firm but uniform wind is desired. The wind considered best has one yarn traverse equal to the circumference of the package.

• **Larger-tube diameters** are being used. Tubes of 1⅝-in. dia. make for more even dyeing and do not compress the yarn so much as smaller tubes. The weight of a package should be about 20 oz. and the diameter about 5¼ in.

• **A new machine** allows one operator to transfer 3,000 lb. of yarn from paper tubes to dye-machine springs in 8 hr. The yarn can be placed on a shipping tube again without winding. The yarn is wound onto 1⅝-in.-dia. paper tubes covered with a knitted sock. The package is placed on the machine, and a spring inserted as the tube is punched out.—Textile World, Jan, p151

Juice Loses No Flavor

True-flavor grape-juice concentrate is the result of Keystone Cooperative Grape Association's use of new equipment built by Blaw-Knox Co. The method can be applied also to cherry, apple, currant, strawberry and other juices.

In processing orange juice, much of the flavor and aroma are lost during evaporation but are partially restored by adding unprocessed juice to the concentrate. But this method was neither practical nor economical with grape juice.

The new method, developed by U. S. Dept. of Agriculture, strips volatile aromatic from the raw juice in a vapor-liquid separator and concentrates the essence fraction separately. This essence concentrate is later added to the juice concentrate to restore flavor and aroma.—Food Eng, Jan, p55

Backfilling by Saturation and Vibration

Backfilling by the "saturation and vibration method" is a new U. S. Bureau of Reclamation specification on the San Diego Aqueduct. Water is added to backfill to make it fluid enough to vibrate. The picture shows how one contractor handled the job. Electric vibrators with water jets attached are mounted on a Ford tractor to consolidate backfill. Power for vibrators comes from a motor-generator set mounted on the back of the tractor. A boom on the tractor lowers vibrators simultaneously into the ditch to provide necessary vibratory action.—Const Meth & Equip, Jan, p63

German Concrete Poles Substituted for Wood

Low-cost concrete poles for Germany's power lines are a success. Essentially, the concrete pole is a round, hollow mast fabricated with steel reinforcement. Diameter of mast at top varies from 4½ to 15¾ in., according to stress. Depth that poles are set in the ground varies according to length, maximum draft, and ground conditions.

Both suspension and special masts are built on stepped concrete foundations. Mast length varies from 59 to 75 ft., depending on soil conditions. Distance between conductors is usually 9 ft., based on 660-ft. maximum span.

The construction employs a centrifugal casting procedure. The mast is formed over steel reinforcement rods. The reinforcement structure is placed in a sheet-steel form with concrete mix of clay-free pit sand, pebbles, and concrete of ⅛- to ¼-in. granulations. Rotation period is 10 to 20 min. at 350 to 500 rpm.

Erection is the same as used on wood and steel poles. Masts and cross arms are delivered separately to erection site and molded together on the ground with a high-quality cement.—Elec World, Dec 28, p92

New-Type Transistor

New manufacturing method produces new-type high-frequency transistors with consistent, reproducible characteristics. Developed by Philco Corp., they are called surface barrier transistors.

The transistors are formed electrochemically. Two small jets of indium sulfate are directed onto opposite sides of a thin strip of germanium. An electric current is passed through the streams to etch away the germanium to a thickness of 0.0002 in. Reversing the polarity of the current then plates metallic indium onto the germanium.

The indium deposits become emitter and collector of a junction transistor as the germanium near the surface takes on an impurity character opposite to that of the germanium base.—Electronics, Jan, p10

WHY THESE TWO LEADERS GOT TOGETHER

W-S HYDRAULIC

WATSON-STILLMAN
INDUSTRY'S LEADER
IN MOLDING PRESSES

HOOVER
THE FIRST NAME
IN "VACUUMS"

At one time or another since 1949 almost every plastic part of a Hoover vacuum cleaner has been molded on Watson-Stillman equipment.

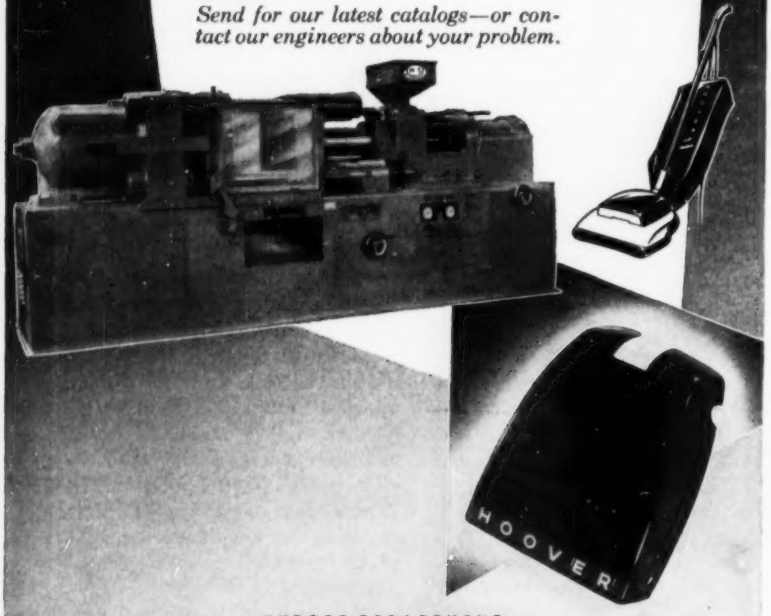
Hoover could not afford to experiment with plastic molding equipment. They had to be sure of performance—sure of production speed—sure of dependability—sure that the machines required very little maintenance.

A phenomenal production growth from six Hoover Vacuum Cleaners a day in 1907 to a position where one-third of all vacuums in use today are Hoovers, necessitated only accepted, preferred equipment that was standard for plastic molding.

It was natural, therefore that W-S Injection Molding and W-S Compression Molding machines were installed—a total of 17 machines.

Consult W-S first about their "Completeline" of Injection, Compression and Transfer Molding machinery. There's a model for every production need.

Send for our latest catalogs—or contact our engineers about your problem.



EXPORT DEPARTMENT

the WATSON-STILLMAN company

DIVISION OF H. K. PORTER COMPANY, INC.

150 Aldene Rd., Roselle, New Jersey

Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Avenue, New York 16, N. Y.
Correspondents Throughout the World

Bottom Loading Cuts Equipment, Evaporation

Standard Oil Co. (Indiana) has been successfully bottom loading tank trucks for several months now. Tanks are filled by pumping fuel through the unloading manifold.

Biggest advantage of bottom loading is that it makes unnecessary the expensive overhead loading platforms and equipment. All that is required is a series of pump outlets. The other advantage is almost complete elimination of vapor loss of volatile fluids like gasoline. Splash occurs only during the few seconds before the fluid level covers the inlet opening. Obviously it is safer.

Loading speed is 600 gal. per min. Manual part of the loading operation is reduced because with overhead equipment the operator must move the filler from compartment to compartment. With bottom loading, he makes one quick connection and fills the various tanks by simply opening the hand valve for each compartment.—Fleet Owner, Dec, p40

Floor-Polish Trends

Victory in the battle of floor polishes in the U. S. seems to be swinging toward the shellac-based polishes, although a few companies stand firm for wax polishes.

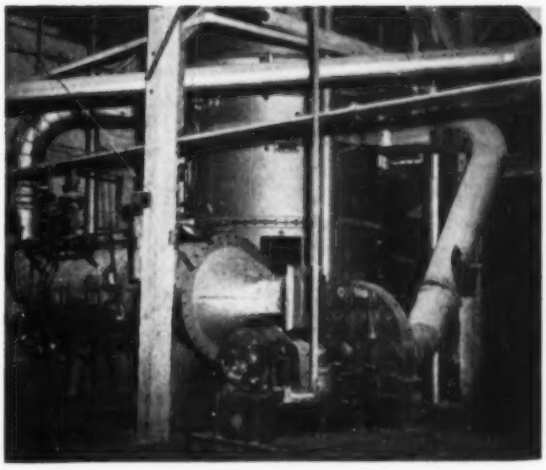
S. C. Johnson & Son, top manufacturer of floor polishes, is pushing its Hard Gloss polish—one low in wax and high in resin content. Other companies too—Boyle-Midway, Beacon, Simonize, and E. L. Bruce—are concentrating on shellac-based polishes.

The major reason for the swing is the price differential between carnauba wax at $1.20 per lb. and bleached shellac at $0.50. Additional reasons: high gloss, hard finish, and relatively tough, nonskid film.

Backers of wax polishes, among them Armstrong Cork and Congoleum-Nairn, still stick to these claims: finish is more water-resistant soon after application, rebuffing restores luster, washing easily removes finish, and wax polish offers better resistance to traffic.—Chem Wk, Dec 12, p65

This Month's How To . . .

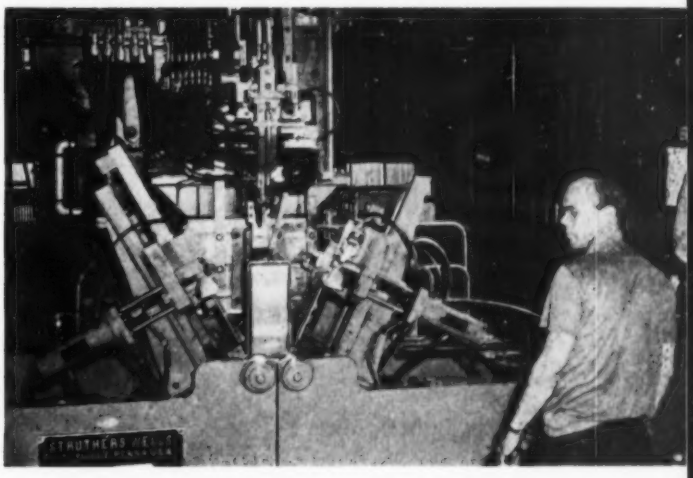
. . . dry salt at one-third the fuel cost



Processing salt is a world-wide job, so Combustion Engrg., Inc.'s new method, installed at Carey Salt Co., will point the way to lower production costs in many companies. A gas-fired horizontal furnace heats air, which then fluidizes and dries the salt in the vertical dryer behind the furnace.

Fluidization gives intimate contact between hot drying air and moist salt crystals so temperatures need be only half those in kiln dryers. A second fluidized bed in the dryer cools dried salt and preheats air for the furnace. Other advantages: less crystal degradation, no separate cooler needed.—Chem Eng, Jan, p166

. . . step up welding speed

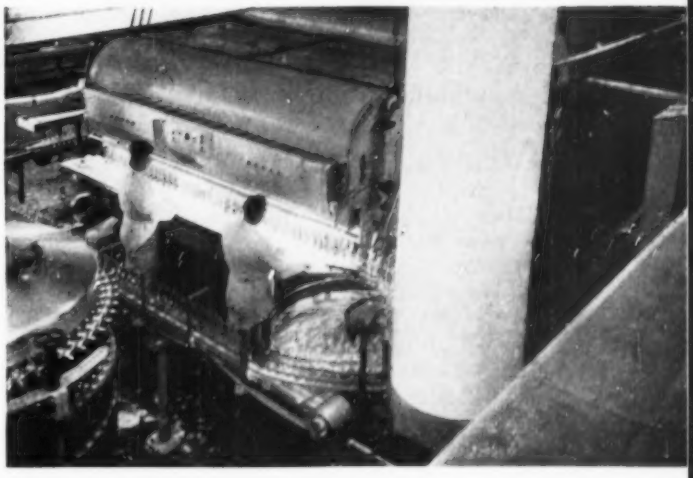


Hotpoint Co.'s new refrigerator plant at Cicero, Ill., is full of advanced production ideas. One is the forming and assembly of evaporators. Aluminum sheet is straightened, sheared, then pierced, embossed, and flanged in a 150-ton press brake.

Aluminum tubing is set on the back of sheet, brazing strips are inserted, and the assembly goes to a furnace for bonding. One machine then forms and welds the evaporator assembly.

The evaporator back is placed in the machine with tube-and-sheet assembly. Two arms move upward to form the assembly to rectangular shape. Welding electrodes move downward to weld edges together. Total assembly time is 15 sec.—Weld Eng, Jan, p29

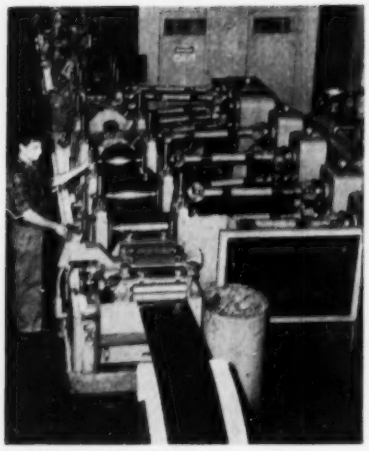
. . . increase filling-line capacity



Brading's Breweries, Ltd., Ottawa, Canada, did it by installing a new bottling line with the world's largest soaker bottle cleaner. Capacity of the Barry-Wehmiller cleaner is 500 bottles per min.

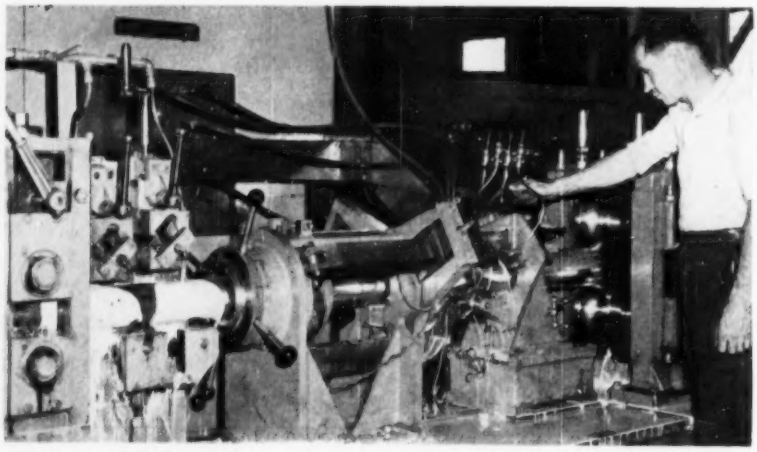
Bottles are fed by conveyor to a Barry-Wehmiller automatic gang loader, which places 40 bottles in each carrier. Bottles pass through a pre-rinse before entering the first soaker compartment. Caustic sprays clean bottles, which then go through two more soaker compartments and the water washing and rinse section.

A conveyor discharges bottles to an unscrambler, which sends them in two lanes to fillers.—Food Eng, Jan, p33



ALUMINUM STRIP passes through nine sets of cold-forming rolls.

TOP VIEW of mill shows pipe going through last rolls into heating coils.



HEATING COILS at right weld the two edges of formed pipe together. Pipe then passes through trimming heads that remove excess metal from seam.

Forms Aluminum Pipe

New high-speed mill is producing aluminum tubing fast and at a low cost. Expected price will be 4 to 4½ % under that of equivalent extruded piping

ALUMINUM IRRIGATION PIPE is being made from coiled strip at Kaiser Aluminum and Chemical Corp. at a cost substantially less than that for extruded tubing of the same quality. Fabricating is done on a Yoder cold-forming mill (McG-H Digest, Aug '52, p50) equipped with a 50-kw. Allis-Chalmers electronic induction heater for welding.

Other advantages of the method, from a finished product viewpoint, include the following:

- Properties of the finished product approach those of cold-rolled aluminum. Tempers available range from dead soft to full hard (0 to H-18); a limited temper range is available in extruded aluminum.
- More alloys can be rolled than extruded.
- Induction-welded pipe has fine surface, good appearance, and uniform wall thickness.
- Higher mechanical properties give strength equal to that of extruded tubing with less stock. Pressure testing to 300 lb. per sq. in. is 150% above specifications.

The mill is now making 4-in. OD pipe with a 0.047-in. wall thickness at 62 ft. per min. Speeds up to 120 ft. per min. are possible, depending on pipe diameter and wall thickness.

To make the 4-in. pipe, 12½-in.-wide coils are passed through nine sets of cold-forming rolls. The first three are simple rolls of increasing convexity. The last two are four-roll idler clusters that exert pressure from inside and outside. The last set brings the two edges together over a mandrel.

The formed pipe passes between the induction-heater coils to weld the edges. No fillet is needed. The welded seam then passes under two cutting heads that remove excess bead. A flying saw cuts finished pipe into 20- or 40-ft. lengths. Pipe is tested under hydraulic pressure and cleaned to remove oil and test fluid and get the pipe ready for shipment.

At present, the machine is stopped when one coil of aluminum is consumed and another has to be threaded through the machine. A butt-welding unit will be installed to weld coil to coil and a looping-pit arrangement worked out to make strip feed continuous.

Pipe sizes that Kaiser will make range from ¾ in. to 4 in. Wall thicknesses will vary with the type of alloy. Thus, the ¾-in. pipe will have minimum and maximum gages of 0.025 and 0.100 in. Gages for the 4-in. pipe are 0.040 and 0.134 in.

Total investment in the mill is about $250,000. An equivalent extrusion-press set up would cost probably twice as much. Foundation costs also are less.

Although Kaiser expects to form only aluminum pipe on its Yoder mill, it has major application possibilities in the nonferrous field. Bridgeport Brass Co. also has installed a similar machine. The U.S. Navy has ordered a Yoder mill for experimental use.—Iron Age, Dec 17, p129

Wire Fabric Reinforces Asphalt on Pavements

Wire fabric reinforcing in asphaltic concrete pavements is getting a trial in the U. S. Welded wire fabric prevents pavement rippling and "piling up" and reduces crack formation.

A recent test pavement was laid in Washington, D. C. Paving was done in sections for comparison. Wire fabric used had a 10-gage wire, welded in 6 x 3-in. rectangles. Sheets were 11½ x 7ft.

Sheets were laid directly on the existing pavement, overlapped 6 in., and tied at several places to prevent shifting as trucks and paver rolled over them. Transverse wires were faced down so that the spreader slid along the longitudinal wires. Sheets were lapped away from the paver, like shingles on a roof.—Const Meth & Equip, Jan, p94

Reduced Inspection Improves Part Quality

Three production departments at Lockheed Aircraft Corp. check their own work quality. Detailed inspection at all stages of assembly in these departments have been replaced by one complete inspection of the assembly just before it leaves the departments.

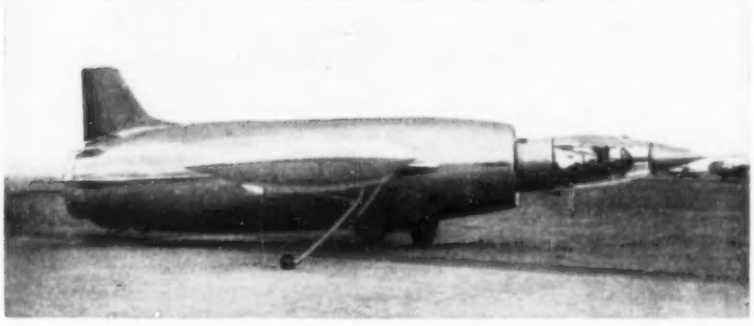
The new system was first put into effect in the department that assembles fuselage side sections for a trainer. Average for such a department would be 50 to 60 complaints and 10 to 12 rejections per airplane. By the third month of reduced inspection, the department averaged only 4.03 complaints and 2.44 rejections. One major inspection station and five minor stations have replaced 44 previous stations.

So far, savings in man-hours have been significant but they are negligible compared with the savings in rework time and materials. For example, in the first 5 months of reduced inspection, production costs of fuselage side sections have dropped 15%.—Am Mach, Dec 7, p125

Photos Speed Reassembly

Machinery that's disassembled for shipment can mean trouble when you try to put it together again. Morgan Engrg. Co. gets rid of this problem by photographing complex parts.

Morgan makes large traveling cranes. It assembles and tests them in its shops, then breaks them down into small units for assembly in the customers' plants. Reassembly is not easy. So Morgan paints identifying marks on various parts and then photographs them while they are still assembled. Result: photographs serve as a guide for putting the crane together again.—Factory, Jan, p129



Mach 2 Forecast for French Aircraft

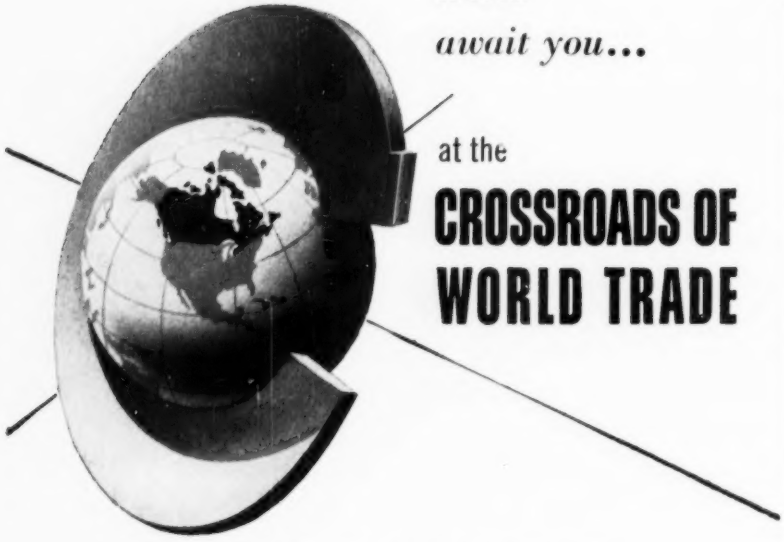
French aircraft-designer Rene Leduc says he expects his first supersonic ramjet to fly in 1955 and predicts it will reach Mach 2 in level flight. The Leduc 022 now is under construction while flight testing continues with the 021 shown above. The 022 will develop power equivalent to a thrust of 60 tons. It will have swept-back wings and will climb faster than the Leduc 021. Fuel will be burned at a maximum rate of 11,000 gal. an hour. The craft will have a limited range.—Aviation Wk, Dec7, p15

Whatever the size of your business or industry—UNDERWOOD has a machine to meet every requirement .. to help you save more by speeding office, factory or governmental accounting and statistical work. UNDERWOOD ACCOUNTING MACHINES are accurate, efficient and easy to operate; only "10 figure keys". They increase your profits.

UNDERWOOD

Sales and Service Throughout the World
Consult your local Underwood Dealer or write to us
UNDERWOOD CORPORATION
International Division
1 PARK AVENUE, NEW YORK 16, N. Y., U. S. A.
Typewriters • Adding Machines • Accounting Machines • Carbon Paper • Ribbons

the products of the world await you...



at the

CROSSROADS OF WORLD TRADE

Here in Toronto, Canada, are competitive products from nearly 30 countries exhibited side by side in one show for your comparison. Here you can save weeks of expensive travel by meeting the key men of science, industry, art and commerce . . . all within a period of two weeks!

Come to buy or come to look, but be at the Fair in fifty-four.

everyone can profit from the TRADE FAIR

For information write to your Canadian Trade Commissioner or Consul or to, The Administrator, Canadian International Trade Fair, Exhibition Park, Toronto 2-B, Ontario.

1954 7th Annual CANADIAN International TRADE FAIR

TORONTO MAY 31 - JUNE 11 1954

OPERATED BY THE GOVERNMENT OF CANADA TO PROMOTE YOUR BUSINESS

Reforming Process Uses Cyclic Regeneration

Ultraforming, announced in November by Standard Oil Co. (Ind.), is a new catalytic reforming process that incorporates a unique method of regenerating catalyst. Three commercial units with a total capacity of 36,000 bbl. per day are being built by Standard and affiliated companies.

Ultraforming is a fixed-bed process using a platinum catalyst. It differs from other platinum-catalyst units by having a reserve or "swing" reactor, which successively takes the place of each of the others during catalyst regeneration.

This system of cyclic regeneration keeps catalyst performance at its peak. It enables continued operations at a high level of catalyst activity and selectivity.

Three major advantages are thus gained: (1) Continued operation at low operating pressure contributes to higher over-all reformate yield, which quickly pays for the regeneration equipment. (2) Octane ceiling is raised at lower pressures as high-octane gasoline can be made before the increase becomes too small to offset the loss in yield. (3) The process is more flexible as catalyst life is less affected by variations in feed compositions or changes in operating conditions.

Standard has made the process available for license to other companies.—Oil & Gas J, Nov 16, p186

Synthetics In New Fields

▶ **Two-bar tricot** made from 30-den., opaque nylon yarn is made into fitted bed sheets by Glen Raven Knitting Mills, Inc. The sheets will retail for about $9.95 for a twin-bed size, but they dry quickly and need no ironing.

▶ **Orlon uniforms** are being tested by service-station attendants. Orlon is resistant to battery-acid damage.

▶ **Nylon air-mail bags** are getting final tests this month by the U. S. Post Office. It estimates that a million dollars will be saved by replacing cotton with nylon bags on airmail routes.—Textile World, Jan, p226

"Know-How" Exchange Leads to Profitable Process

A search for a roasting method that would provide a stable sulfur dioxide source for an economical acid plant led Dowa Mining Co., Kosaka, Japan, to a new process for extracting copper and zinc from a single electrolyte. The company had been plagued by large annual bills to compensate nearby farmers for the damage to their rice crops from waste gases. Hidesaburo Kurushima, Dowa's president, became interested in Dorr Co.'s FluoSolids tests.

Following his personal investigation, he sent Suketoshi Tsunoda, refinery superintendent at Kosaka, to Dorr's laboratories in Stamford, Conn. Tsunoda built a pilot-plant model of the Dorrco reactor. Recalling a wartime brass process, Tsunoda further suggested that it would be possible to recover copper and zinc from a single solution.

Today, the process is a reality and is past its first year of successful operation.

Refines Copper and Zinc

Combining two techniques, one Japanese and the other American, led to profitable recovery of both copper and zinc from a single electrolyte

COPPER AND ZINC are both being recovered electrolytically by stages from a single solution in the hydrometallurgical plant of the Dowa Mining Co., Japan. Dorr Co.'s FluoSolids roasting method and an adaption of Japanese war-time electrolytic recovery of copper and zinc from brass make the process possible.

Here's how the process operates: from a feed bin the ore is automatically weighed and discharged into a repulper tank, which automatically prepares a mixture of 70% solids and 30% liquids for feeding into the Dorrco FluoSolids reactor.

The reactor is a 20-ft.-dia. and 16-ft.-high steel tank, double lined. It has a constriction plate in the bottom with 400 nozzles, through which air is blown at a pressure of 3 to 3.5 lb. per sq. in. to provide oxygen for the roast and to agitate the roast. The overflow pipe, through which two-thirds of the calcine is drawn off, is 5 ft. above the constriction plate.

Inflow from the repulper is a little above the roast level. To prevent localizing in the bed, the charge is sprayed downward with compresed air. Temperature of the roast is maintained at 700° C. ±5°. The copper and zinc sulfides are transformed into sulfates and traces of oxides. Iron sulfide becomes ferric oxide.

The overflow (two-thirds of the calcine) goes into a quench tank of water agitated with air. One-third of the calcine carries over with the gases into the waste heat boiler. Here solids are extracted through cyclones and sent to a quench tank. The remainder is recovered in cyclones and passed through quench tanks.

All quench tanks feed into a single collection tank, from which the calcine is pumped into a series of three agitators and onto a continuous counter-current decantation setup comprised of a series of five Dorr thickeners.

Overflow from the first thickener, containing 5 to 6% copper, 10% zinc, and 0.2% iron, goes through filter presses and on to the copper tank house. Residue from the No. 1 thickener is pumped into No. 2 thickener, from No. 2 into No. 3, No. 3 into No. 4, and No. 4 into No. 5. Residue from No. 5 thickener, representing 40 to 45% of the original concentrate, is pumped to the waste dam.

In the copper tank house, the solution passes through three stages. In the first two, cathode copper of 99.97% purity is obtained. The third produces sponge copper containing 80% copper and 4% zinc.

The first stage draws the copper concentration of the electrolyte from 60 g. per liter down to 25 g. per liter. In the second stage, the concentration is brought down to 12 g. per liter. The final electrolysis recovers all but 1 g. per liter and produces a copper sponge.

The remaining solution contains 0.1% copper, 10% zinc, and 8 to 10% sulfuric acid, as well as other impurities. It is first neutralized with fine limestone; the gypsum produced is shipped to a cement plant. Iron traces are removed by adding more limestone and manganese oxide and removing the precipitate in a filter press. Zinc dust is then added to precipitate the remaining trace of copper, nickel, and cadmium. Beta naphthol precipitates the cobalt.

The temperature of the solution as it leaves the filter press is 50 to 60° C. Cathode zinc of 99.99% purity is recovered in the zinc electrolysis.

According to Japanese research, the process is possible when a solution contains 10% zinc and up to 6% copper. Therefore, it is effective to utilize the ore at Kosaka, which contains copper and zinc in a ratio of 1 to 1.5 or 1.6.—Eng & Min J, Jan, p72

Hourglass Axle Bearings

Axle-bearing bores on Westinghouse Electric Corp.'s diesel traction motors are machined to an "hourglass" shape, with the center of the bore having a diameter of 0.010 in. less than the diameter at each end of the bore. This difference in diameter allows for bending curvature of the axle caused by the locomotive's weight.

The design along with special lubricators, has improved axle-bearing life and has eliminated the need for removing axle bearing-cap shims to allow for wear. Bearing life is now 300,000 miles. —Rail Loc & Cars, Dec, p70

ONE OF A SERIES SHOWING WILLYS VEHICLES AT WORK THROUGHOUT THE WORLD

In VENEZUELA...

as in Countries Around the World

WILLYS Brings Progress

NEAR LAKE MARACAIBO: The 'Jeep' follows a pipe line. Willys vehicles serve Venezuela's vast oil industry from exploration to production.

RAILROAD CONSTRUCTION calls for "go-anywhere" transportation. Engineers in charge use over 50 Willys 4-Wheel-Drive Vehicles.

CIUDAD PIAR: One of the 152 Willys vehicles operated by a mining company through roadless areas in its extensive iron ore development.

WILLYS 4-WHEEL-DRIVE VEHICLES transport men, equipment and power to the hard-to-reach places—such as this site on a road-construction project.

CIUDAD BOLIVAR: A local farmer picks up supplies with his Universal 'Jeep' after they have been brought in by Orinoco River boat.

in Transportation —

The World's Most Useful Vehicles

MODERN TRANSPORTATION, as provided by Willys 4-Wheel-Drive Utility Vehicles, is helping farmers to increase food production.

ROADS OR NO ROADS — the extra traction of 4-wheel drive takes Willys vehicles through — even a stream doesn't stop them.

From the Orinoco Delta to the Maracaibo lowlands — throughout Venezuela — economic growth and progress go hand-in-hand with Willys utility vehicles. They are helping in the development of vast deposits of oil and iron . . . creation of new industrial centers . . . building of new highway systems . . . expansion of agriculture and commerce . . . and in many phases of everyday life.

The people of Venezuela know from experience that Willys 4-Wheel-Drive Vehicles are *unduplicated* and *unbeatable* for travel under difficult conditions of terrain and weather. With their "go-anywhere" traction, Willys vehicles transport personnel and cargo on or off the road — over rough, broken trails — through remote jungle regions drenched by torrential rains.

In Venezuela, as in country after country, Willys vehicles are proving their *superior* qualities of utility, ruggedness and economy. These are the qualities that have earned for Willys products the enviable reputation as the *standard utility vehicles of the world*. These are the vehicles that are ready to serve you.

WILLYS-OVERLAND EXPORT CORPORATION

TOLEDO 1, OHIO, U.S.A.

Sales and Service Throughout the World

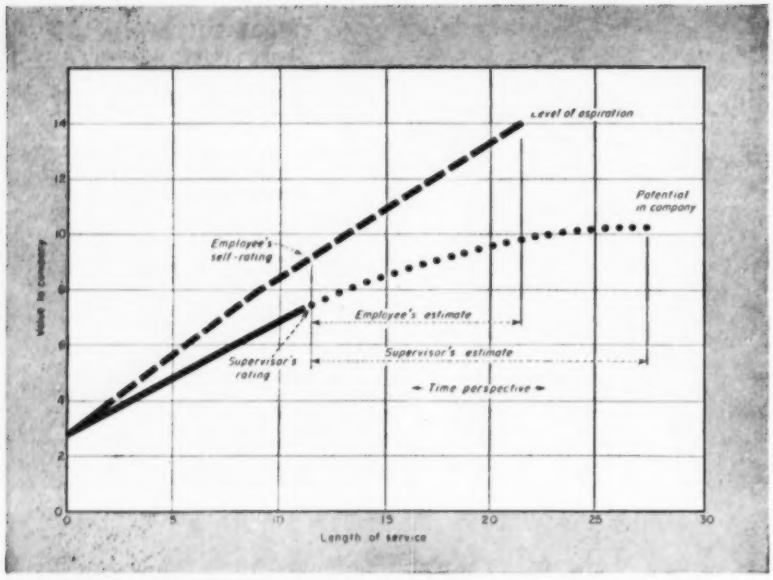
UNIVERSAL 'JEEP'

WILLYS STATION WAGON

WILLYS SEDAN DELIVERY

WILLYS TRUCK

AERO WILLYS



TOO FAR, TOO FAST is where this man thinks he is going. The employee's self-rating is way out of line with his supervisor's rating.

Realism in Job Relations

A realistic man-to-man relationship between an employer and employee will allow the employee to develop into a more valuable asset to the company

MANAGEMENT DEVELOPMENT must stimulate growth on subordinate levels. Growth is an increase in a person's ability to achieve (1) the goal you set for him and (2) the goal he sets for himself. For a man to grow, he must:

- Know what is expected of him.
- Know how he is doing.
- Be given assistance as needed.
- Be rewarded on the results of growth.

These requirements are not met in most plants. People usually do not know what is expected of them or where they stand.

It takes a dynamic process to put these four requirements into effect. The performance appraisal illustrated in the diagram shows one particular relationship between a supervisor and one of his men.

In this situation, the individual's estimation of his value to the company is higher than his supervisor's rating; so there is a variance in the rating of performance on the current job. What happens if this variance is not resolved? The diagram projects the sad story. The individual goes along blithely assuming he can reach his high level of aspiration. However, he has no basis for being realistic. In this case, there is a decided variance in the individual's goal and his estimated potential in the company.

A third variance exists between the time perspective of the individual and the company. We sometimes talk about a man like this as one who wants to go too far too fast.

The major requirement on both sides is realism. Each point on the diagram is in reality only an estimation, and the points should be subjected to frequent questioning and modifications. Here is where the four principles come in. If each individual knows just what is expected of him, he has a basis for being realistic. If he knows how he is doing—that is, if his superior gives him a frank statement of his strong and weak points—he can be much more realistic. Modification is not just a one-way affair. As often as not, the superior may change his ratings.

The four principles should begin to operate when each man joins your organization. You will probably have to pick up right where you are. How can this be done in a practical way?

- **First,** pin down what is expected of each man. Ask the man you are rating to do the same.
- **Second,** use the description to review subsequent performance. This is what we are paying him for; so why not rate each man against his job description? The vital requirement is that the employee use the same description to rate himself prior to any discussion.
- **Third,** give some consideration to the progress each man can make. Stress should be placed on qualifications to avoid assumptions of "inherent rights" to a promotion.
- **Fourth,** have a frank discussion with each individual. This discussion should concentrate on the variance between the self-ratings of the individual and the ratings of his supervisors. Reducing these variances tends to minimize the other types of variances.—Textile World, Jan, p77

Industrial Computer

Detroit firms have banded together to finance a giant electronic computer for Wayne University. The machine will solve industrial problems on valve mechanisms, bearing loads, shaft vibration, automobile ride qualities.

Burroughs Corp. built the machine, which is called UDEC (for Unitized Digital Electronic Computer). It is fed by converting information into holes punched in a paper teletype tape. A tape reader converts the hole pattern into electrical pulses.

The information is sent to a memory drum. This drum is an aluminum cylinder coated with a layer of black iron oxide, which can be magnetized in spots by a writing head. A mathematical unit makes the calculation, and the answer is printed as decimal numbers by a teletype printer.—Iron Age, Dec 17, p78

Color Motion Pictures Now Recorded on Tape

An amazing electronic development, revealed by Radio Corp. of America in December, records sound motion pictures—black and white or color—on magnetic tape instead of conventional film. The new technique may prove the key to commercial telecasts of color pictures in the near future. It could revolutionize motion-picture photography.

The method impresses electrical signals through specially developed recording heads (small magnets) onto the magnetically treated surface of a plastic tape. As the tape moves past the heads, the magnets change polarity of the iron-oxide particles on the tape so that they become a code of the original signals.

Two signals are put on the tape for black-and-white pictures—one for sound and the other for picture and the synchronizing signal. Five channels are needed for color pictures—one each for red, green, and blue, one for the synchronizing signal, and the fifth for sound. Recording is done at 30 ft. per sec., instead of 15 in. per sec. as in sound recording.

Advantages of the technique include: (1) lower cost, (2) relatively simple additional equipment, (3) no chemical processing as with film, (4) immediate playback possible, (5) tape transmission by coaxial cable.—Electronics, Jan, p5; Prod Eng, Jan, p203

Pumped-Storage Plant

The idea of pumped-storage hydro plants, used extensively in Europe, has been given a big boost in the U. S. At present, only two are in operation in the U. S. and two others are planned, with equipment ordered.

Now proposed is what may be the biggest of all—a 6-mile long reservoir formed by two dams at ends of a valley 4 miles from Lake Erie. The proposal was made by J. F. Shadgen, Energy Accumulation & Exchange Corp.

The bottom of the reservoir would be about 1,300 ft. above sea level, with water level at 1,390 ft. Reservoir capacity would total 400,000 acre-ft., covering an area of 11 sq. miles.

The pumping and power plant would be an outdoor type on Lake Erie, with reversible units to act as both pumping motor and generator. Cost estimates run to $60-million for a 400,000-kw. project. —Power, Jan, p97

New Uses for Ceramics

Ceramics are replacing established materials in many applications. Here are some uses for Sintox, an aluminum-oxide ceramic made by Lodge Plugs Ltd., Rugby, England:

- Tips for cutting tools.
- Guides on cable stranding machines.
- Wire-drawing dies.
- Locating pins to hold small assemblies together for spot welding.
- Wearing plates in machines through which wire passes in the manufacture of radio tubes.
- Guide fingers for molybdenum, tungsten or manganese nickel wire in tube manufacture.—Mach, Jan 2, p24

Phenolic Foam Finds Some New Applications

Phenolic foam is made by converting a liquid resin to an expanded solid in 2 or 3 min. without external heat or pressure. And the expanding resin will assume the shape of the cavity in which it is formed, completely filling it. These characteristics assure success with phenolic foam in the foamed-in-place technique.

Instead of hand-tailored balsa wood, the U. S. Navy is using phenolic foam to fill blisters on the sides of its aircraft carriers. Savings amount to about $20.00 per cu. ft. of material placed.

The Navy is not alone in taking advantage of phenolic-foam's properties. The material is going into low-temperature and acoustical insulations, structural reinforcement for aircraft, buoyancy media for boats of all types, and packaging materials. Research is also being conducted on new uses in the insulation field—for either home or industry.—Mod Plastics, Dec, p103

VICTOR MOLYFLEX

hack saw blades

Now high speed steel blades can be used for *all* metal cutting jobs. Victor "Molyflex" Blades are shatterproof, so flexible they cannot be broken in use in a frame. Yet they cut just as well, last just as long as high speed steel blades.

VICTOR SAW WORKS, INC.
MIDDLETOWN, N. Y., U. S. A.
MAKERS OF HAND AND POWER HACK SAW BLADES, FRAMES AND BAND SAW BLADES

Australia, Walter A. Cox Pty Ltd., Shorter House, 193-195 Clarence St., Sydney, N.S.W. • Argentina, Will L. Smith, S.A., 443 Luis Saenz Pena 451, Buenos Aires • Belgium, Maison Mouillet, Rue St. Jean 12, Liege. • Brazil, Alfredo Kramer & Cia. Ltda., Caixa Postal 557, Rio de Janeiro also Alfredo Kramer & Cia. Ltda., Caixa Postal 2984, Sao Paulo. • Chile, Leopold Machhauster, Casilla 458, Santiago de Chile • China, Kane Import Corp., 10 E. 40th St., New York 16, N. Y. • Colombia, Hans Schultz, Apartado Aereo 802, Barranquilla. • Costa Rica, Arthur W. Gough, Apartado No. 133, San Jose. • Cuba, Cuban Air Products Corp., 60 E. 42nd St., New York 17, N. Y. also Cuban Air Products Corp., Paseo De Marti (Prado) 2152-54, Havana. • Denmark, Chr. Schmidt & Co., Amaliegade 24, Copenhagen. • Dominican Republic, Hector Lluberes, Arzobispo Nouel 74, Ciudad Trujillo. • Ecuador, Cesar Barahona L., Casilla 175, Quito. • Finland, O.Y. Trade A. B., Helsingfors. • France, Societe S. E. R. E. B., 148 Rue de Noisy-le-sec, Bagnolet (Seine). • Haiti, W. F., Andre Cameau, 241 Ave. Pdt. Trujillo 241, Port-au-Prince. • Holland, Melders & Zonen, Hoog straat 339, Rotterdam. • Honduras, El Auto Schales & Lazano, Tegucigalpa, D. C. • India, Associated Imports & Exports Co., G.P.O. Box 1486, Bombay, also Associated Imports & Export, P-6 Mission Row Extension Co., Calcutta. • Iran, Donya ye now Trading Co., Avenue Nasser Khosrow, Teheran. • Ireland, Hendrian Bros. (Dublin) Ltd., 37-39 Up. Dominick St., Broadstone, Dublin. • Italy, Defries & Company, Viale Monza 14, Milano. • Jamaica, B.W.I., Abraham, Henriques & Jay, 25-27 Duke St., Kingston. • Mexico, Agencias Canadienses, Apartado 6 bis, Mexico 1, D. F. • Norway, A. B. Laurantzon, Post Box 392, Oslo. • Palestine, S. Rahmani, Rahmani's Bldg., Haifa. • Panama, Demetrio Fernandez G., Apartado 574, Panama, R. de P. • Peru, A. y F. Wiese S. A., Edificio Wiese, Lima. • Philippines, Reliance Commercial Enterprises, Rm. 402, 4th Floor, 123 Juan Luna Street, Manila. • Portugal, Pierre Damaz, Alexandra Braga, Porto. • Switzerland, Armand Cuhat & Company, 65 Todistrasse, Zurich. • Syria also Lebanon, Iraq, Aden, Arabia, Transjordan, Kuwait, Bahrain, Enis Hindie, P. O. Box 167, Aleppo, Syria. • Turkey, Leon Barnardin Marca, Posta Kutusu 85, Istanbul. • Uruguay, Will L. Smith S.A., 1181 Uruguay 1183, Montevideo. • Union of South Africa, Belgian Congo, Guatemala, Hawaii, Puerto Rico, Spain, Venezuela, Frazar & Company, 50 Church Street, New York 7, New York.

Two W&T Air Operated Master Chlorinators in the Lerma project, Mexico City

Internationally Dependable . . .

. . . *W & T Equipment* for the COMMUNITY

Through the years, and in many countries throughout the world, Wallace & Tiernan processes and equipment have contributed to the protection of community life.

Mexico City, the capital of Mexico, is an excellent example of how a civil administration, with the aid of W&T equipment, helps to safeguard the health and welfare of its citizens.

Recognizing that the availability of a safe water supply is a major responsibility to its community, the Mexican capital executed the fabulous Lerma project. Completed recently, after nine years of construction, at a cost of $25,000,000, this new project is capable of supplying 1,564 gallons of water per second. Water is brought from the headwaters of the Lerma River to storage tanks outside the city through an aqueduct which includes some seventeen tunnels.

Two Wallace & Tiernan Air-Master Chlorinators are installed in the Lerma project to insure adequate sterilization.

Wallace & Tiernan Chlorinators are well known internationally for dependable, economical performance. W&T's successful performance in the Lerma project is typical of the thousands of other installations all over the world.

Write today, without obligation, for technical literature on W&T Chlorinators for every municipal and industrial need.

WALLACE & TIERNAN PRODUCTS FOR COMMERCE, INDUSTRY AND THE COMMUNITY

Ammonia Control Apparatus — Cathodic Protection Systems — Chlorinators — Chemical Feeders — Decay Control Processes for Produce — Electric Marine Beacons — Flour Processing Chemicals — Magnetic Separators — Pharmaceuticals — Precision Instruments — Sifters. F-91

AGENTS IN MOST COUNTRIES

WALLACE & TIERNAN CO., INC.

NEWARK 1, NEW JERSEY, U. S. A.

Assembly-Line Methods Erect Factory Quickly

Eight men and a crane were all that were needed to erect a 64,000-sq. ft. reinforced-concrete factory at the rate of 10,000 sq. ft. per day in Houston, Tex. A continuous flow of columns, girders, and roof-deck channels from a precasting plant 5 miles away was fed to the crane—operating right on the floor slab where trucks delivered the structural elements.

The building, with a wire-reinforced concrete slab on the ground, is made of lightweight expanded-shale concrete. Aside from the cast-in-place floor slab, only the tilt-up wall panels and pilasters for the factory were cast at the site.

Girders were the only prestressed members in the building. A method, under license of BBR (Zurich, Switzerland) and new in the U. S., anchored the prestressing wires.

At the precasting plant, structural elements were cast and stored in the order in which they would be needed for the continuous erection of the factory. Trucks picked up the units—assorted in sequence of erection—and delivered them to the building site at a predetermined rate. —Eng News-Rec, Dec 10, p40

Air Aids in Strip Mill

Air-operated devices aid in several stages of steel-strip production at Arthur Lee & Sons, Ltd., Sheffield, England. Here are some typical applications:

1. **In final rolling** on a cold-roll strip reversing mill, an air cylinder operates a wiper to remove oil coolant from the strip. Two other cylinders operate side guides to maintain strip position. A fourth exerts pressure on a wedge board to keep the strip flat.

2. **Coiler speed** is controlled by an air cylinder keeping an arm resting on the coil under tension. As coil diameter increases, the cylinder, through a servo ram, changes motor speed.

3. **Pegs** on which narrow strip is coiled in an edge-dressing machine are air-operated to hold the internal diameter of the coil. —Mach, Nov 21, p1956

What's New in 1954 Trucks

WILLYS four-wheel-drive truck winches itself from a ditch in practice for four "good-will" cavalcades that will visit Latin America, Canada, Europe, and Far East this year. They will show what the Jeep can do.

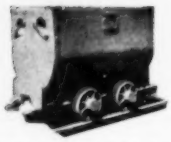
INTERNATIONAL HARVESTER truck model R-140-4 x 4 is one of two four-wheel-drive models in four wheelbase lengths designed for rough terrain. This one mounts Failing drill.—Const Meth & Equip, Jan, p146

FORD series T-800 is first tandem-axle truck Ford ever built. It handles payloads (with body) up to 29,943 lb. As a tractor, it pulls gross combination of 60,000 lb. Truck has 170-hp. V-8 engine.

REO heavy-duty F-226M tandem truck, equipped with dump body built by Heil Co., carries 9½-cu. yd. payload. Body design shifts weight to front wheels.—Am Auto, Feb, p102

GENERAL MOTORS has dressed up this new 100 series GMC pickup with two-tone paint job, new grille, and lots of chromium. It boasts a 125-hp., six-cylinder engine and 3.9 to 1 axle ratio.—Am Auto, Feb, p100

Mainline Freight Cars



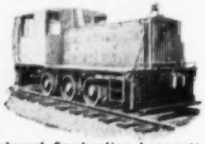
Dump and Industrial Cars

PRESSED STEEL CAR COMPANY

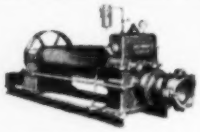
Cradle and Industrial Cars

Sugar Cane Cars

equipment which is establishing



Internal Combustion Locomotives



Brick and Tile Machines

new standards of efficiency in

Trackwork of all types

Inspection Cars

transportation . . . agriculture, . . . mining, . . . construction

Weed Burners

Unistrut Framing for Building and Storage Needs

. . . manufacturing and processing industries

Whatever your requirements may be, the name "Pressed Steel Car Company" on the equipment you buy is your assurance that you have the *right* equipment and the *best* equipment for the job . . .

Let Pressed Steel Car Company experience go to work for you *now*. Send an outline of your problems or objectives to our Engineering and Research Department. They will gladly suggest the most effective way to satisfy your needs. No obligation!

Steelcar

EXPORT DIVISION
25 Broad St, New York 4, N. Y.

PSC

Products to Serve Industry . . . Farm . . . and Home Hydraulic Pumping Units • Precision Deep Well Plunger Pumps • Steel Sucker Rods • Engine Lathes • Aircraft Landing Gear Stock Struts • Precision Gears & Gear Mechanisms • Dairy Cans & Equipment • Self-Closing Receptacles • Permanent Cookware Farm Holding Tanks • Storage Hoppers • Alloy Steel Containers • Oil Storage Tanks • Rendering and Softening Tanks • Agitators • Smoke Stacks • Dust Collectors • Coal and Ash Hoppers • Lock Nuts & Bushings • Couplings & Connectors • Fittings & Electrical Accessories • unisheltor Homes

Railway Freight Cars (Mainline) • Industrial Railway Cars for agriculture, mining, construction, factory and mill service • Permanent and portable Industrial Railway Track Equipment • Locomotives for mainline switching and an industrial railway service • Clay, Brick and Tile Machinery • Railway Inspection and Gang Cars • Weed Burners • Unistrut Metal Framing

PRESSED STEEL CAR CO., INC.

Sales Create Jobs— It's Up To Management

"Full employment is the result of a sufficient volume of the ultimate sales. It is also an essential factor in the ultimate sale because only with full employment can we have the widespread purchasing power that makes possible the ultimate sale."

With this statement in a recently published book, Alexander R. Heron, vice-president of Crown-Zellerbach Corp., becomes one of the first industrialists to admit that it is management's job to maintain high employment.

To management, Heron says bluntly, "The danger is that private management will not accept the responsibility of creating and maintaining jobs for over 50-million workers. . . . If private management will give first place to its responsibility to provide jobs through sales, it will have a new and powerful appeal for the cooperation of every other group in the economy."

According to Heron, every top executive interested in preserving what management calls the free enterprise system must think in terms of a positive economic program with jobs as the top objective.

In the face of labor's new demands for a guaranteed annual wage and an administration friendly to business, Heron's book is timely.—Business Wk, Jan 16, p90

Controls Mold Filling

In slip casting of sanitaryware at Universal Rundle Co., New Castle, Pa., a dangling electrode is placed in the pouring cup, along with the pouring nozzle. As the slip rises in the cup and comes into contact with the electrode, a circuit is closed, thereby causing a solenoid valve to stop the flow of slip.

This electronic device relieves the operator of manually shutting off the flow of slip, thereby freeing him for other duties. It also avoids any spilling of slip onto the mold. This improves quality as spilled slip cakes the mold pores and prevents effective drying.—Ceramic Ind, Dec, p96

TECHNICAL SHORTS

Now Foamed Polyethylene—Cellular polyethylene with half the weight and a dielectric constant about half that of regular polyethylene has been developed by Bakelite Co. Material is expanded to about one-half of its original specific gravity with the aid of a blowing agent. New material makes possible the insulation of antenna lead-in wires for uhf. and vhf. television receivers.—Mod Plastics, Jan, p206

Helps Land Airplanes—Large numbers of airplanes can be directed into position for blind landing approaches by a new system, called VOLSCAN, developed by U. S. Air Force Cambridge Research Center. The system, based on radar, employs automatic tracking and computing equipment.—Electronics, Jan, p14

Faster Cooking—Experimental retort at Purdue University cooks foods faster by giving cans an end-over-end motion to improve heat penetration. Shaft-borne yoke and can-bearing frame within a horizontal pressure retort shell are driven by an external motor. Movement is free spinning and rotating action.—Food Eng, Jan, p54

Signs of the Times—Virginia Department of Highways is changing from metal to plastic route-number signs as a means of saving money and repair time. When a plastic sign is damaged, workmen can repair it right on the spot. The damaged portion is cut out; a new disk, taken from a plastic blank, is inserted.—Eng News-Rec, Dec 3, p27

Where the Money Goes—Of the personal income dollar of the U. S. citizen at midyear 1953, 81.1¢ went for consumer spending, another 6¢ into savings, and 12.9¢ for direct personal taxes, reports the Institute of Life Insurance. In 1949 spending accounted for 87.7¢, savings 3.2¢, and taxes 9.1¢.—Business Wk, Dec 12, p122

Ductile-iron Dies—State Foundry & Machine Co. has made heading, tapering and bumping dies for 20-mm. brass cartridge cases from ductile iron (gray iron with magnesium added to spheroidize the graphite). Results: lower cost than tool-steel dies and a die life 18 times as long.—Am Mach, Dec 7, p34

New Magnetic Substance—Indiana Steel Products Co. (Valparaiso, Ind.) will soon begin production on its new Indox magnet. The magnet, made of iron oxide and barium carbonate ceramic materials, is claimed to be lighter than metal and to have much greater adhering force than conventional magnets.—Chem Wk, Dec 19, p58

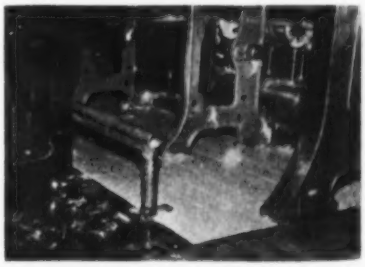
Stop Sign for Excavators—Western Electric Co.'s Chicago plant employs red concrete to enclose its 12,000-v. underground power-distribution system. All plant construction men are instructed that, whenever they encounter this type of red concrete while excavating, all work must stop and the electrical department must be notified. It will take the necessary precautions.—Factory, Dec, p146

All-weather Oils—No longer is it necessary to change oil when the weather changes. Four oil companies have announced all-weather lube oils and greases: Gulf Oil Corp. with Gulfpride H.D. Light, Standard Oil Co. (Ind.) with Permalube SAE5W-20, Mid-Continent Pet. Corp. with D-X Special, and Texas Co. with All Temp Grease.—Chem Eng, Jan, p142

Sulfur from Coal—Recovering sulfur from coal is not attractive at present. One company doing some experimenting has found it uneconomical to recover $27- to $28-per-ton sulfur from a coal-mine refuse pile running 15% pyrite by weight. With sulfur at $35 per ton, however, recovery could be profitable.—Coal Age, Jan, p135

Three Ways Floor Paint Improves Housekeeping

Under Machines

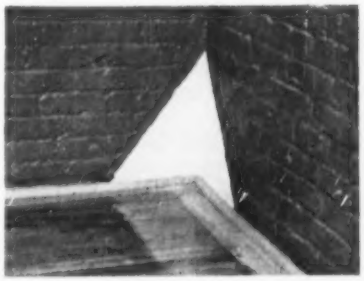


Neat panel of oil-resistant paint under machine collects less lint and dirt than adjacent floor subject to the same conditions. Paint repels oil, dries in 30 min., and can be applied directly on an oil-soaked floor.

Under Trash Cans

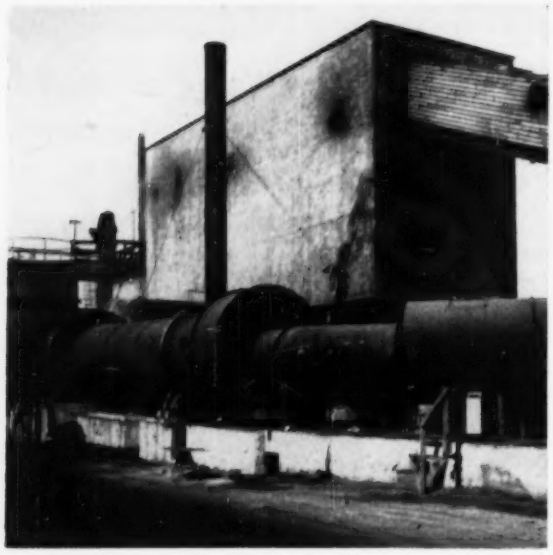
If a piece of paper or a dirty cup misses the can and lands on the spotless area below, who would leave it there? This out-of-traffic area has also been covered with oil-resistant paint. Bright paint on can helps.

In Corners

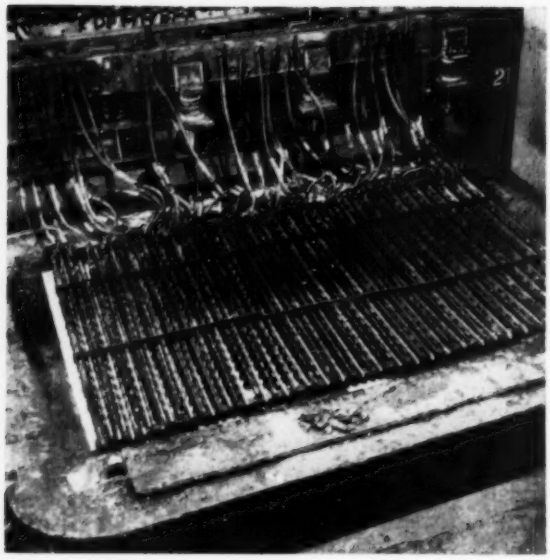


No dirt can hide here. Paint panel covers a 4-in. strip along wall where floor-machine operation is difficult. White triangle reflects light into the corner and discourages dirt.—Textile World, Jan, p156

Calcining converts oxide form



Electrolytic cell recovers dioxide



Manganese-Dioxide Process

As high-grade ores become scarce, the chemical industry will devote increasing attention to utilization of low-grade ores. This is being done ir iron. Now announced is a new process for manganese dioxide

LARGE-SCALE PRODUCTION of high-grade, battery-active manganese dioxide has now been achieved from low-grade ores by Western Electrochemical Co. at Henderson, Nevada. Its important use as a depolarizer of dry cell batteries is a well known fact.

The new process takes ores averaging only 20% manganese and, by electrodeposition, turns out electrolytic MnO_2. Importance of the process is emphasized by the fact that, although MnO_2 is found in widespread areas of the world, only a few of the deposits are active or pure enough for battery use.

Ore from nearby mines is crushed and ground in a hammer mill to a particle size of —20 mesh. It is mixed with Bunker C oil and roasted at 750° C. in a kiln to convert insoluble higher oxides to the acid-soluble, lower-oxide form. Next, leaching with spent sulfuric acid from the electrolytic cells, plus added fresh acid, dissolves the metallic components of the raw ore. An insoluble sludge separates out in a thickening tank.

The crude leach solution is treated with barium sulfide in an agitated tank. Cobalt and nickel impurities form insoluble sulfides. Calcium oxide is added, and the sulfide sludge is removed in a second thickener.

Aerating the solution oxidizes iron, which is then removed along with sulfur, arsenic, and organics, by a rotary filter. The filtrate is used as the feed solution for the electrolytic cells.

The cells (there are 33, each with 600 anodes) have unique rod-shaped graphite anodes. MnO_2 deposits on the anodes and does not break away easily as it would from plate anodes. This advantage permits long operating cycles as the rod-shaped anodes do not have to be removed frequently as would conventional graphite plates.

Conversion of manganous sulfate into manganese dioxide and sulfuric acid in the cells probably involves (1) electrochemical oxidation of sulfate to persulfate and (2) chemical oxidation of manganese from the divalent to the tetrovalent state—followed by hydrolysis to MnO_2.

Deposited MnO_2 and the anodes, after removal from the cells, are crushed and separated in a metallurgical jig. The dioxide is then ground in a mill until 95% passes a 100-mesh screen.

The product is washed in a thickening tank, filtered, and dried in a rotary dryer. Drying temperature is kept as low as possible as the battery-active, gamma-phase dioxide is transformed into the non-battery-active, alpha phase above 350° C.—Chem Eng, Jan, p152 & 372

Fine-Particle Silicas Growing in Interest

Ultra-fine silicas are being made in ever increasing tonnages. Their many uses include rubber reinforcing, grease thickening, emulsion stabilizers, flatting and dulling agents, thermal insulators.

The high level of interest in this field is shown by these companies' activity:

• **Godfrey L. Cabot early** last year began importing a fine silica, called Aerosil, from the German firm, Degussa.

• **Dow-Corning** late last year put on stream a 30-ton-per-month plant using the Degussa process. Silica is formed by burning silicon tetrachloride in a gas-heated vaporization chamber and collected as soot particles by cyclones.

• **Du Pont** this year will begin commercial production of two new silica products—one as a grease thickener and the other as a rubber filler.

• **General Electric** is developing a silicone-modified silica aerogel. The process consists of neutralizing a mixture of sodium silicate and the silicone component with sulfuric acid, adding alcohol, removing sodium sulfate as a by-product, heating the alcohol solution in an autoclave, cooling, recovering the aerogel product in bulky chunks, and screening to size.

Other producers include Columbia-Southern with Silene and Hi-Sil and Monsanto Chemical with Santocel.—Chem Eng, Dec, p122

1,200-Mph. Plane Ordered

The Canadian Defense Department recently ordered the new CF-105 delta-wing twin-jet fighter into production. Unofficially, the CF-105 is said to have a speed of about 1,200 miles per hr., a range of 1,500 miles, and an armament of rocket missles.

Avro Canada is expected to produce the CF-105's new jet engines. The new power plants will give the CF-105 a near-vertical-climb performance, eliminating the need for long runways.—Aviation Wk, Jan 11, p51

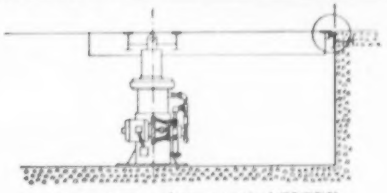
Here's how a public utility SOLVED its truck-loading problem with a GLOBE self-leveling RAMP

This **is the problem:**

The shipping-room floor of one of the buildings of a public utility is above the level of the paved driveway outside. There is no outside loading wharf. It would cost too much—and delay shipments—to have men lift heavy loads from shipping floor to truck bed. What's more, it would increase the risk of injury to workers.

This **is the solution:**

The problem was solved by installing a standard Globe type C-68E self-contained, self-leveling ramp. No ground excavation was needed. Power cylinder, electric-motor oil pump, oil reservoir are a single integral unit resting on a gusseted base plate. Loaded hand trucks are rolled across this hydraulically-powered platform quickly and *safely*—there is no delay in loading and unloading operations. The 14 inch lip of the Ramp rests on the truck bed and the Ramp rises or lowers as the truck springs flex under changing loads. Roll-over capacity is 16,000 pounds. When not in use, the Ramp is lowered and the overhead door brought down to close the entrance completely. This Globe OiLIFT eliminates the need for an outside platform . . . makes it easy to provide a *sheltered* wharf.



This diagram shows a typical GLOBE self-leveling RAMP installation.

GLOBE
THE BEST LIFT

Every day, all over the world, GLOBE OiLIFTS® solve problems of lifting, loading, positioning, and materials handling. Use this coupon to get the GLOBE story.

Globe Hoist Company McGH-612
1000 E. Mermaid Lane
Philadelphia 18, Pa., U.S.A.

Please send me FREE a copy of "Case Studies in Modern Lifting."

Name .....
Company .....
Address .....
City and State ..... Country .....

PRINT THE WEIGHT

. . . stop costly human errors!

Use Toledo Printweigh Scales to stop human errors in reading, remembering and recording your weights . . . assuring that the accurate indication of the Toledo dial reaches your accounting records without human error. Control your costs with Printweigh in receiving, stockrooms, batching, shipping and other operations in all plants today. Wide selection of types and capacities. We will be glad to send details on Printweigh or other Toledo products . . . write for catalog T-10. Toledo Scale Co., Toledo 1, Ohio, U. S. A.

SALES AND SERVICE IN 50 COUNTRIES

SINCE 1901

NEW! FAST! Toledo Speedweigh Scales with over-and-under indication are available in three sizes, 5 lb., 20 lb., 50 lb. Wide angle reading; choice of platters and scoops. Write for bulletin 1416M.

TOLEDO®

HEADQUARTERS FOR SCALES

New Gasoline Additive Makes Cars Run Better

In February, Ethyl Corp. put on the market a new preignition gasoline additive—a haloalkyl phosphorus compound designated as ICC. It is being sold to refiners for blending motor fuel to combat preignition and spark-plug fouling in high-compression automobile engines.

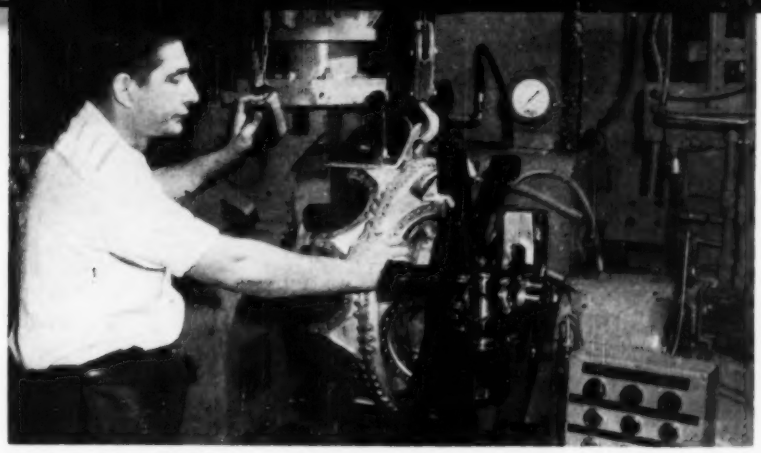
This new additive is just another move in the scrambled market that began when Shell Oil Co. last summer introduced gasoline with TCP (tricresyl phosphate). Since then, "alphabet" gasolines have been announced by Continental Oil, Cities Service Oil, Globe Oil & Refining, Petco, Deep Rock Oil, Frontier Refining, and Sunset Oil.

The new gasolines spurred refiners who are trying to meet preignition requirements with higher octanes. Esso Standard Oil brought out a premium fuel with a 95 octane number.

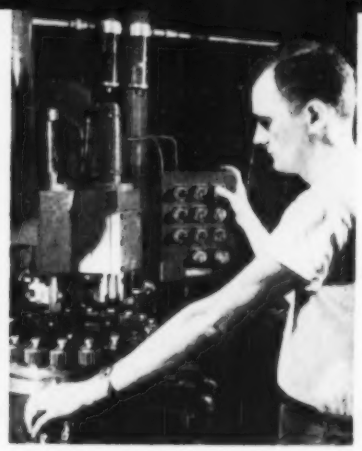
This was the market that Ethyl stepped into with its new additive. Ethyl claims not that its new additive will solve all preignition and fouling problems, but that it will control them to a practical extent. Also, two or three tankfuls of additive gasoline return fouled plugs to normal operation.—Oil & Gas J, Dec 14, p88

Have You Missed . . .

. . . the thought-provoking article on U. S. foreign investment beginning on page 11? We think it's important to you because the investment dollars that U. S. companies send abroad are an important means of improving the economies of the countries where they go, as well as good business for the companies themselves. But it's a two-way deal because dollars, as a rule, go where they are welcome. If you want further specific information on your country or area, we recommend a study made by the U. S. Department of Commerce. Called "Factors Limiting U. S. Investment Abroad," it is for sale at 55¢ by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.



SPECIAL MACHINE automatically assembles master and connecting rods to three crankshaft sections. It maintains proper clearances and bolt stretches. Assembly is sent by hoist and monorail to the next station.



PINION-RING carrier machine tightens bolts and crimps fasteners to gear pinions on the "green line."

Automated Engine Assembly

ASSEMBLY COSTS for aircraft engines have been cut in half by an automated line at Curtiss-Wright Corp. The first such installation for aircraft engines, it is efficient at partial or full operation. Equipment cost will be recovered in less than 2 years.

Development of the automated line was undertaken to improve quality as well as to cut manufacturing costs on the turbo-compound engines. Automatic machines that do everything from assembling a complete crankshaft to tightening bolts and crimping fasteners have been built to order.

A conveyor and belt system moves parts through assembly. The bench assembly area has 15 conveyor lines from which parts are removed, placed in either automatic torque or assembly machines or fixtures, and assembled. Subassemblies include cylinders, crankcase front sections, rear housings, and similar units. They are then moved to pre-line assembly and assembled into the basic engine.

Each engine, mounted on a rolling stand, is moved by a floor conveyor through a "green line," then mounted in an oil rig that pumps oil through the engine under pressure to test for leaks, bearing fits, and assembly errors. After washing, the engines are run 4½ hr., torn down, inspected, and reassembled on another automated line called the "final line."
—Am Mach, Nov 23, p172

REAR SECTION is being maneuvered for assembly with power and front sections on the stand. When the front section points downward, the rear part is placed into position by men and the automatic machine.

ASSEMBLY MACHINE indexes the engine so mount surfaces face the assembler. It also rotates a propeller shaft to extend the connecting rods for installation of pistons and cylinders carried to area by roller conveyors.

NEW PRODUCTS

New Tractor-Shovel in Six Models Is Heavy Duty; Has Many Applications

A new line of heavy-duty "Michigan Tractor-Shovels" are available in three types and six models with buckets ranging from 15 cu. ft. to 2¼ cu. yd. for a wide range of materials-handling applications. Three major types of the six models are offered:

- Two-wheel drive with bucket-wheel drive and rear-wheel steering.
- Two-wheel drive with rear drive wheels and bucket-wheel steering.
- Four-wheel drive with rear-wheel steering.

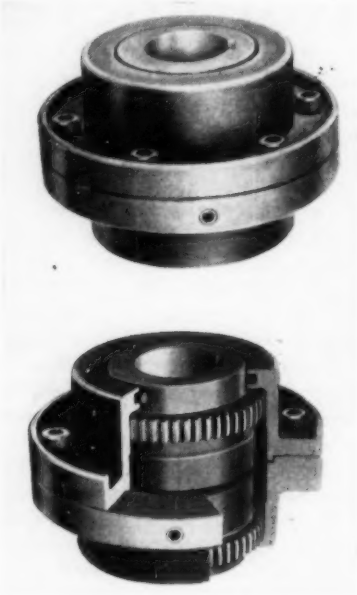
All component parts are designed and manufactured for high quality and performance. All major parts are easy to get at for maintenance. Any one part can be removed in its entirety without removing other components. Parts can be interchanged among the various types and models, thereby cutting down on replacement-parts inventory for "fleet" operators.

Heavier weight and more horsepower than units of comparable rating make the tractor-shovel a sturdy machine capable of continuous heavy-duty operation. Other features include: (1) steering boosters standard on all models; (2) elimination of conventional foot clutch with torque-converter transmission controlled by manual levers on the steering column and a two-speed manual over-drive lever, for speeds up to 28 miles per hr.; and (3) a specially designed planetary reduction in outer wheel hubs for low torque load on axles and high safety factor.—**Export Div., Clark Equipment Co., Battle Creek 73, Mich.**—Coal Age, Jan, p102

Detector Locates Noise

The Elec-Detec Model V locates equipment troubles by locating noise sources in bearings, pistons, gears, and other moving parts. A milliammeter indicates sound impulses visually, while earphones provide audible operation.

The instrument consists basically of a metal probe (serving as a microphone), an amplifier, and a selector housed in a carrying case. It is so sensitive that sounds normally heard only at high operating speeds are picked up at low speeds or even when the machine is turned over by hand. A germanium crystal diode rectifies current to record electrical impulses on the meter.—**American Name Plate & Mfg. Co., 4254 W. Arthington St., Chicago 24, Ill.**—Pet Proc, Nov, p1764



Geared Flexible Couplings Available in Ten Sizes

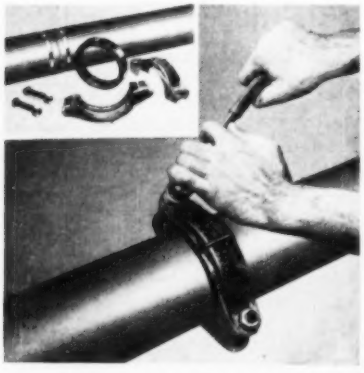
New line of couplings is designed for high-speed, high-torque applications. They are sturdy, lightweight, able to accommodate shaft misalignment and end float.

Two-section, free-floating housing has internal gear teeth. The wide internal tooth face permits the end float. A constant clearance at the root of the internal teeth permits misalignment.

Ten sizes are available, with bores from 1 to 6 in. and horsepower ratings at 100 rpm. from 2 to 450.—**Link-Belt Co., 2680 Woolworth Bldg., New York 7, N. Y.**—Power, Jan, p164

Safety Trouble Lamp

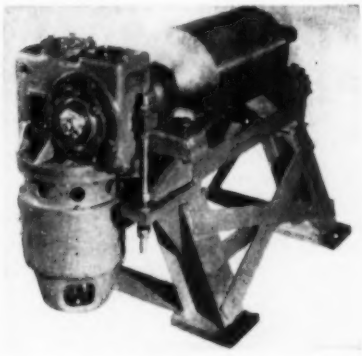
Type EPLH lamp is a lightweight explosion-proof trouble lamp particulaly suitable for inspecting oil and gasoline drums, process tanks, inaccessible gages, and other possibly hazardous equipment. It consists of a cast-aluminum lamp chamber, concentrating lens, and explosion-proof cord connector. The chamber holds a 12-volt automobile bulb. Current is supplied from an explosion-proof 120/12-volt transformer.—**Crouse-Hinds Co., 1374 Wolf Street, Syracuse 1, N. Y.**—Elec C&M, Dec, p125



Coupling for Grooved Pipe

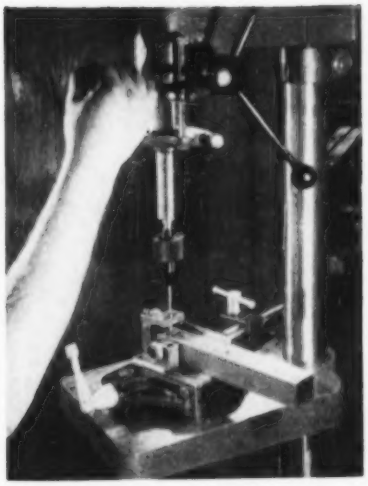
Lightweight coupling for grooved-pipe systems called Gruvajoint saves time, weight and space in coupling grooved-pipe systems where pressures do not exceed 500 lb. per sq. in. Coupling automatically absorbs expansion and contraction stress, ground motion, and vibration.

It remains leakproof under end pulls up to 7,500 lb., permits layout misalignment up to 3°, and will withstand temperatures from —65°F. to 200°F.—**Gustin-Bacon Mfg. Co., 210 W. 10th St., Kansas City, Mo.**—Const Meth & Equip, Dec, p149



Roll-Table Gearmotor

New-type gearmotor for aluminum- and steel-mill roll-table operation has driving shaft equipped with a sleeve section that permits direct mounting on roll-shaft extension. A torque rod anchors the drive and prevents its turning, so the whole drive "rides" with the roll. Using a hollow-shaft mounting and turning the motor vertically downward save space normally needed for motor and coupling connnections. —**Westinghouse Electric International Co., 40 Wall St., New York 5, N. Y.** —Elec C&M, Jan, p129



Quick-Change Safety Vise

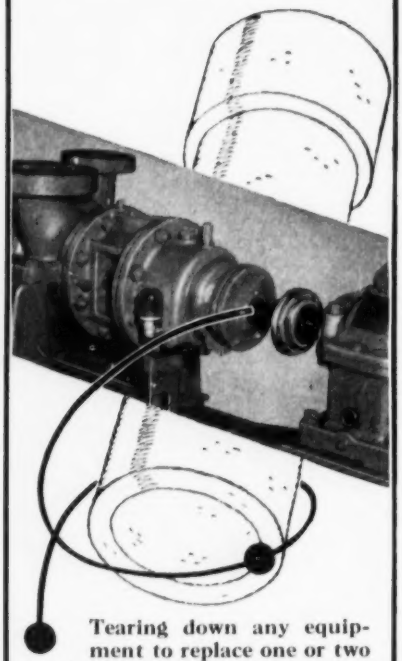
A new vise, designed for fast set-ups, has three bases for easy jig attachment. Any number of holes can be drilled without removing the work as the vise turns over on three sides for drilling flexibility.

The vise locks securely by a turn of the T handle at any position on the table, thus making it a dependable drill jig when duplicate pieces are required. With a choice of either a 9- or 12-in. jaw opening, the vise is a good holding device for end and angle drilling.—**American Machine and Foundry Co., 216 Madison Ave., New York 16, N. Y.**—Bus Trans, Jan, p104

Pint-Size Economy Tractor Adds Versatility

New tractor is small and compact, versatile and maneuverable—and inexpensive enough so that even the smallest plant can afford to buy one. It is called Yard Hand, weighs about 135 lb., and is capable of pulling a 5,000-lb. load. Driving the tractor is a 1½-hp. air-cooled engine. Travel speed is 2 mi. per hr. in low gear and 4½ mi. per hr. in high. In addition to many hauling jobs around the plant, Yard Hand can be used as a live-power source for driving equipment such as saws and generators. It can be converted to perform many housekeeping and maintenance jobs.—Hiller Engineering Corp., Redwood City, Calif. —Factory, Dec, p156

DELORO STELLITE
stops wear-worry



Tearing down any equipment to replace one or two parts is costly.

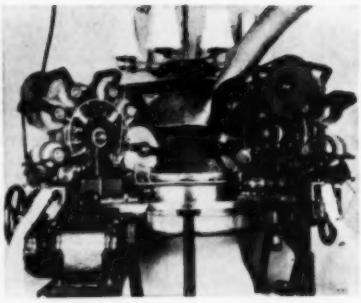
That is why pump manufacturers world renowned for quality, commonly use stainless steel to resist corrosion or high temperature but choose *Deloro Stellite* to protect shafts, sleeves and other critical parts against added wear from abrasion. It keeps pumps running from 300% to 1000% longer between overhauls.

Learn how Deloro Stellite, cobalt chrome tungsten alloy, will keep your equipment operating many times longer. Write for booklet: B.9e.

Two factories to serve you:

DELORO SMELTING & REFINING
COMPANY LIMITED
DELORO • ONTARIO • CANADA

DELORO STELLITE LTD.
SHIRLEY • BIRMINGHAM • ENGLAND
Agents throughout the world.



Carding Units Use Sliver To Produce Knit Pile

New circular knitting machine has a carding unit at each of its four feeds. The unit, consisting of a cylinder with two workers, two strippers, a lickerin, and a doffer, feeds card web to the needles to be formed into a pile.

Depth of pile depends on the length of staple in the silver, although staple lengths need not be constant. Cotton, wool, horsehair, acetate, nylon, or Dynel can be used alone or in blends. Up to four slivers can be used at one feed. The lickerin speed can be changed to regulate the density of pile. A high lickerin speed with a heavy sliver gives a dense pile.

Some fabrics may be used directly from the machine without finishing. It is expected that the new fabric will go into garment linings, floor coverings, shoe linings, toy coverings, and many similar applications.—**Wildman Mfg. Co., Morristown, Pa.**—Textile World, Jan, p133

Unit Stops Plane Spirals

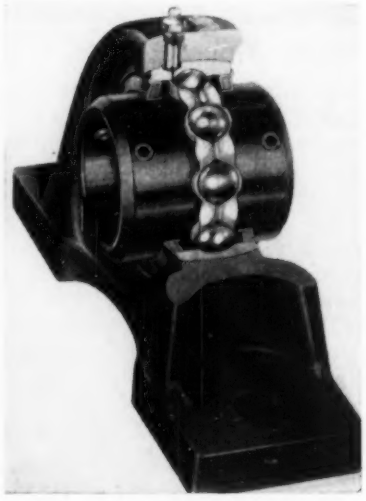
A new "automatic rudder," called Arcon, prevents inadvertent spirals for light-planes up to twin-Beech size. Arcon automatically operates the plane's rudder to oppose any change in aircraft heading.

Arcon consists of two units (1) a rate gyro-amplifier that senses airplane yawing and generates a counteracting signal, (2) a rudder servo that displaces the rudder in accordance with these signals. The servo employs a d-c. motor and two magnetic power clutches. Gyro-amplifier dimensions are approximately 4¼ in. in dia. and 9 in. long.—**Lear, Inc., 3171 S. Bundy Drive, Los Angeles 34, Calif.**—Aviation Wk, Jan 18, p57

Card Files Save Steps

Designed for tabulating cards in three different file sizes, and for three sizes of index cards, new removable tray files save trudging back and forth between files and working area. Drawers are ball-bearing suspended.

Removable trays speed up work and increase filing efficiency. The trays swing easily out of the cabinet, for carrying to a more convenient work area.—**Corry-Jamestown Mfg. Corp., Corry, Pa.**—Am Business, Dec, p51



Zone-Hardened Bearing Has Double Extended Race

Manufacture of zone-hardened ball-bearing units with double extended race includes process for induction heat-treating the inner race ring through the ball-path section only. Extended parts of the race remain unaffected, so hardened setscrew threads can bind against soft race threads for positive locking.

Double extension of the inner race gives maximum bearing support on the shaft and guarantees a positive lock between inner race and shaft to reduce shaft wear. Result is less machine downtime as bearings can be removed easily for replacement and the shaft is not worn beyond required tolerance for new bearing fit. As most of the inner race remains relatively soft and tough, shock and vibration resistance is increased. —**Stephens-Adamson Mfg. Co., Aurora, Ill.**—Prod Eng, Jan, p240

New Product Briefs

Floating Torch—A torch assembly for use on Cut-O-Matic portable cutting machine gives accurate bevel cutting regardless of steel-plate unevenness. A guide wheel, resting on the plate, raises or lowers the torch to maintain proper clearance. The Cut-O-Matic can cut up to 16-in. thickness with three-hose torch.—**National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.**—Weld Eng, Dec, p80

Controls Level—Tektor control indicates level of liquid or solid material to within $\frac{1}{8}$ in. Its electronic circuit operates by change in electrode capacitance caused by approach of material. Unit has one tube, no moving parts.—**Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. Fourth St., Philadelphia 33, Pa.**—Electronics, Dec, p310

Clean Exhaust—New exhaust head for industrial stacks removes dirt and liquid particles from exhaust steam or vapor discharged to atmosphere. Entering vapor is given a rotational motion so particles are thrown outward to walls of the purifier and then removed.—**V. D. Anderson Co. 1945 W. 96th St., Cleveland 2, Ohio.**—Paper Ind, Dec, p1051

High-strength Tape—New electrical tape features Du Pont Mylar polyester film backing and a thermosetting adhesive. Called "Scotch" electrical tape No. 56, it has high heat resistance, extreme toughness, and high resistance to cold flow. It is designed for use as a coil wrap and core insulation in fine wire coils and solenoids.—**Minnesota Mining & Mfg. Co., St. Paul, Minn.**—Ind Dist, Jan, p132

Apron Conveyors—Piano-hinged apron conveyors in three pan types, four chain pitches, and four basic assemblies can fill many conveyor needs, as handling castings, stampings, scrap, and chips. Pans are made of steel, stainless steel, aluminum, and other metals.—**Link-Belt Co., 2680 Woolworth Bldg., New York 7, N. Y.**—Iron Age, Jan 7, p284

World Famous For Precision and Flexibility

EX-CELL-O

PRECISION BORING MACHINES

Typical of the machine tools that have made the Ex-Cell-O name famous are its machines for precision boring, turning and facing. The Ex-Cell-O Style 1212-A Machine shown handles small and medium size parts and can be tooled for small or large volume work. One or more precision spindles can be arranged on each machine bridge. Controls of the hydraulically operated machine table are easily adjusted for an automatic cycle which may include rapid movement, two infinitely adjustable feed rates in both directions of travel, immediate or dwell reverse and stop.

This and many other Ex-Cell-O products are fully described in Catalog 27312. Use the coupon below to get your copy.

53-12

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN, U.S.A. • CABLE ADDRESS: XLO, DETROIT, U.S.A.

PRECISION MACHINE TOOLS • CUTTING TOOLS • MACHINES TO PACKAGE MILK IN SANITARY PAPER CONTAINERS

EX-CELL-O CORPORATION Detroit 32, Michigan, U.S.A.

Please send without obligation copy of Ex-Cell-O General Catalog No. 27312.

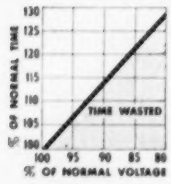
Name_____

Company_____

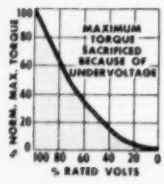
Address_____

City and Country_____

Low voltage causes this:

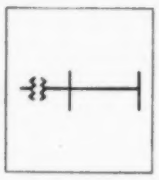


JOBS TAKE LONGER, heating and drying equipment doesn't perform well.

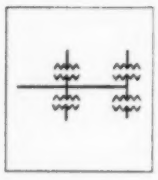


MOTORS OVERHEAT, burn out, don't provide full torque.

Here's what to do:



IF EXCESSIVE line drop is caused by too long feeders.



INSTALL Allis-Chalmers Unit Substations to keep voltage up.

How to Solve Low Voltage Problems

If you are losing production due to low voltage caused by excessive line voltage drop—because you've added new machines since your power distribution system was designed . . . or because production schedules have been changed—here's how to make sure voltage drop isn't costing you money.

Allis-Chalmers LCS Load Center Unit Substations can be installed at load centers to eliminate long runs of expensive, low-voltage cable. They are complete package units, easy to install.

Consult the Allis-Chalmers representative in your country or write:

ALLIS-CHALMERS MANUFACTURING CO.
General Machinery Division
Export Dept., Milwaukee 1, Wisconsin, U. S. A
Factories in U. S. A. and Canada

ALLIS-CHALMERS DISTRIBUTORS THROUGHOUT THE WORLD

ALGERIA—Alger.
ARGENTINA—Buenos Aires.
AUSTRALIA—Sydney.
AUSTRIA—Vienna.
BELGIUM—Brussels.
BOLIVIA—La Paz.
BRAZIL—Rio de Janeiro, São Paulo, Recife (Pernambuco), Porto Alegre.
BRITISH BORNEO—Sandakan.
CANADA—Montreal.
CHILE—Santiago.
COLOMBIA—Barranquilla, Bogota, Medellin, Cali.
COSTA RICA—San José.
CUBA—Havana.
DENMARK—Copenhagen.
DOMINICAN REPUBLIC—Ciudad Trujillo.
EL SALVADOR—San Salvador.
ENGLAND—London.
FINLAND—Helsinki.
FRANCE—Paris.
FRENCH MOROCCO—Casablanca.
GREECE—Athens.
GUATEMALA—Guatemala.
HAITI—Port-au-Prince.
HAWAII—Honolulu, Hilo.
HONG KONG—Hong Kong.
ICELAND—Reykjavik.
INDIA—Bombay.
IRAN—Teheran.
IRAQ—Baghdad.
ISRAEL—Tel-Aviv.
ITALY—Milan.
KENYA—Nairobi.
MALAYA—Kuala Lumpur, Ipah, Kota Bharu, Penang.
MEXICO—Guadalajara, Mexico City, Monterrey, Tijuana.
NETHERLANDS—Amsterdam, The Hague.
NEW ZEALAND—Wellington.
NICARAGUA—Managua.
NORWAY—Oslo.
PANAMA—Panama.
PERU—Lima.
PORTUGAL—Lisbon.
PUERTO RICO—Ponce, San Juan.
REPUBLIC OF INDONESIA—Djakarta, Surabaja.
REPUBLIC OF THE PHILIPPINES—Manila.
SARAWAK—Kuching.
SINGAPORE—Singapore.
SOUTH AFRICA—Johannesburg.
SPAIN—Madrid.
SURINAM—Paramaribo, Nieuw-Nickerie.
SWEDEN—Stockholm.
TAIWAN (FORMOSA)—Taipei.
TANGANYIKA—Dar es Salaam.
THAILAND—Bangkok.
TUNISIA—Tunis.
TURKEY—Istanbul.
UGANDA—Kampala.
URUGUAY—Montevideo.
VENEZUELA—Caracas.

C-5701

Machinery and Equipment to Help People Produce More, Have More—Live Better!

Electric Power

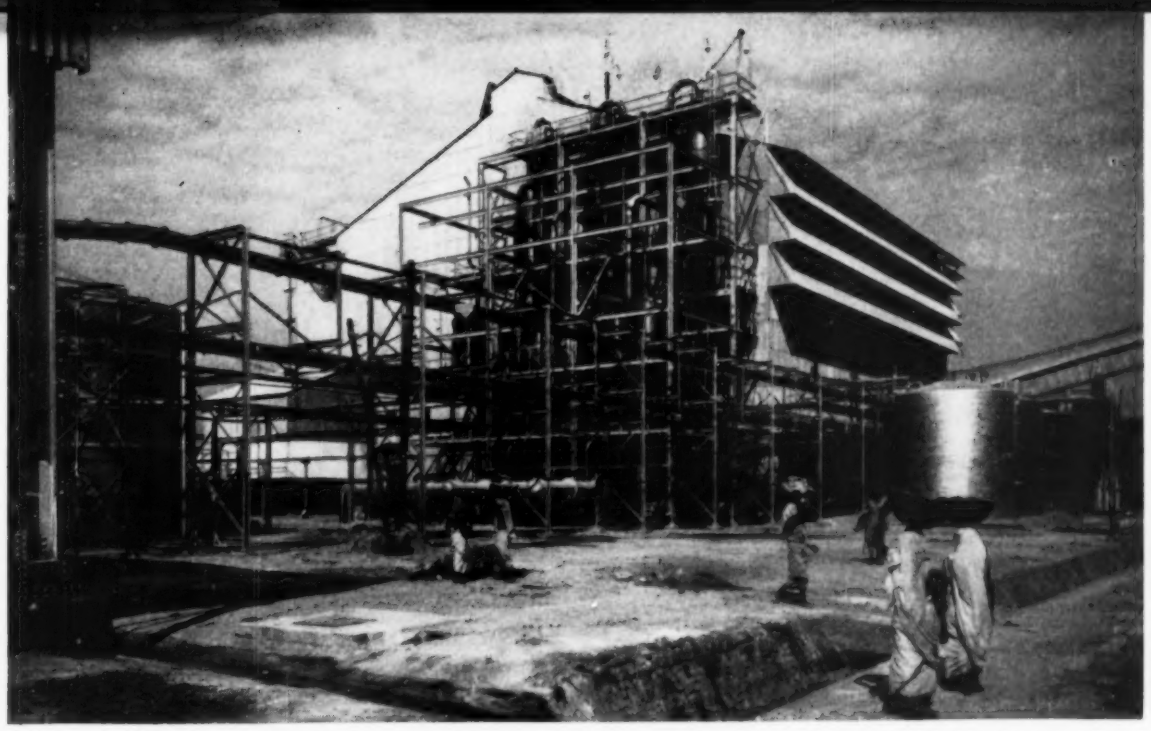
Hydraulic Turbines

Processing

Centrifugal Pumps

Motors and Drives

ALLIS-CHALMERS



An American Cyanamid subsidiary designed and built this fertilizer plant at Sindri, India

Chemicals in World Trade

Chemicals are one of the most important products in today's foreign trade. Their manufacture is world wide, and one of the world's foremost manufacturers is American Cyanamid.—An original Digest article

FORTY-FIVE YEARS AGO, at Niagara Falls, a new company began using the wealth of hydroelectric power there to turn out calcium cyanamide for the first time in this hemisphere by the nitrogen fixation process (nitrogen taken from the air and combined with calcium carbide). The company, named American Cyanamid Co. from its product, was able to develop an abundant source of nitrogen fertilizer that helped avert a world-wide food shortage.

The name of the firm, however, is hardly descriptive of it today. The company, fed by the demand created by an expanding American economy and stimulated further by the needs arising out of two world wars, has grown from a single plant at Niagara Falls into one of the world's foremost manufacturers of diversified chemicals and pharmaceuticals.

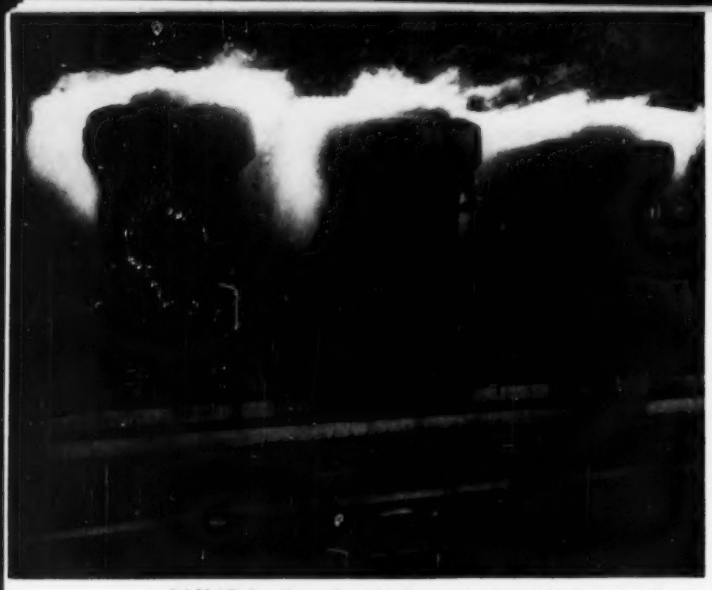
American Cyanamid now has sales of about $380-million annually, assets of more than $400-million, and 42 plants in the U. S., Canada, Wales, Mexico, South Africa, India, Australia, and Japan. The plants produce countless different items for virtually every industry that uses chemicals.

Largely responsible for the company's rapid growth was William B. Bell, who headed the firm for 28 years until his death 3 years ago. It was Mr. Bell who gave American Cyanamid its broad base of diversification. He put the company together, piece by piece, by building new plants and buying others.

Entrusted with the job of maintaining today's smooth-running organization and developing its long-range potentials is Kenneth C. Towe, who moved up to the presidency vacated by the death of R. C. Gaugler, who had succeeded Mr. Bell.

American Cyanamid's diversification has made it a major supplier of acids, alkalies, fertilizers, and other heavy chemicals; of industrial chemicals for the rubber, textile, paper, metal and leather industries; of plastics and resins, weed killers, insecticides, explosives, and mining chemicals; of catalysts to improve gasoline and additives to improve motor oil.

The company's diversification policy also accounts for its Lederle Laboratories Division, one of the nation's largest manufacturers of pharmaceuticals and biologicals (including the "wonder" drugs Aureomycin and Achromycin); for Davis & Geck, a subsidiary that for years has been a major supplier of surgical sutures and other surgical items; and for Chemical Construction Corp., which develops chemical manufacturing processes and



CANADA—five electric furnaces turn lime and coke to calcium carbide for calcium cyanamide manufacture

HOLLAND—Koninklijke Zwavelzuurfabrieken makes cracking catalyst under American Cyanamid license

builds chemical plants for firms all over the world, as well as for the parent company.

The steady growth of the many activities of American Cyanamid would not have been possible had not the firm possessed a faith in research. The company currently spends approximately 5% of its sales dollar for research and development.

Current developments include:

- The completion this year of a $50-million petroleum chemical plant near New Orleans.
- A titanium dioxide plant now under construction at Savannah, Georgia. Titanium dioxide is the whitest of all white pigments and is used by the paint, rubber, textile, plastic, floor-covering and ceramics industries.
- A new agricultural chemicals research laboratory for the study of fertilizers, insecticides, fumigants, fungicides, herbicides.
- Plans for erection of facilities at Witbank, South Africa, for producing calcium cyanamide.

American Cyanamid, during its domestic-expansion program, did not neglect its chance to develop its world-wide business. Two years ago, S. C. Moody, vice president of American Cyanamid, stood on a platform next to Prime Minister Jawaharlal Nehru at the opening of India's first pharmaceutical and dyestuffs plant at Bulsar and, in one sentence, neatly summed up his company's philosophy regarding foreign activities: "If we can help others help themselves and thereby increase the standard of living by even a fraction of a per cent, we automatically enlarge our markets and can properly share some of the resulting benefits."

American Cyanamid took a small financial interest in the plant, provided the "know-how" necessary for setting up production, and, at its Bound Brook, New Jersey, factory, trained the young Indian chemists that now are in charge of manufacturing operations in the new Bulsar plant.

The company's foreign activities have not only helped its earning picture but have also been of immeasurable value to the people in other lands. By exporting significant amounts of its products, establishing plants abroad, exchanging technical information with foreign scientists and industrialists, and licensing foreign firms to produce its products, American Cyanamid has contributed to the strengthening of the economies of the countries with which it deals.

Wholly owned subsidiaries of American Cyanamid operate eight foreign plants and 12 strategically located foreign offices. Here's the way the company's foreign picture looks today:

Dyestuffs, pigments, intermediates, rubber chemicals, plastics, and resins are distributed to all countries in the Eastern Hemisphere by the dyes and chemicals export department, headed by Fraser M. Moffat. Distribution of these products as well as pharmaceuticals and biologicals to Central and South America and the West Indies is handled by a subsidiary, Cyanamid Inter-American Corp.

The dyes and chemical export department also carries on a program of foreign technical training. It is through this program that American Cyanamid has been able to expand the manufacture of many of its products in foreign fields. Patent licenses are assigned to foreign firms, which may—under certain circumstances—have their key personnel trained by America Cyanamid, either in their own plants or in the U. S.

For example, American Cyanamid granted a license to a Netherlands chemical firm that helped make that company continental Europe's first producer of synthetic fluid cracking catalyst for the petroleum industry. Using American Cyanamid's patents, processes, and techniques, the Netherlands firm manufactures microspheroidal cracking catalyst, a powder that flows like liquid and "cracks" the large molecules of semirefined petroleum into the smaller molecules that make up high-octane fuels, raw materials for synthetic rubber, and other highly important petroleum products. The catalyst is sold to Western European oil refiners.

Other licensing arrangements, involving manufacturing for chemicals and pharmaceuticals, are in operation in Japan, England, France, Italy, Spain,

SOUTH AFRICA—Wilbank plant produces cyanide for the gold-mining industry and insecticides for agriculture

INDIA—Lederle manufacturing laboratory at Bulsar makes finished pharmaceuticals, including Aureomycin

and India. In addition to foreign plants manufacturing under a license, several are wholly or partly owned by American Cyanamid. Each plant, except for a few technical personnel, uses local labor and is locally managed.

At Witbank, South Africa, South African Cyanamid (Pty.) Ltd., a wholly owned subsidiary, manufactures cyanide for sale to the gold-mining industry in South Africa and Southern Rhodesia. With a few exceptions, personnel of the plant and office at Witbank consists of South African citizens. The universities in South Africa provide excellent training for engineering, chemical, and technical careers.

The Witbank plant contributes heavily to the economy of the country because it provides an essential commodity to the gold mines that have been the backbone of South African economy for years.

In India, a major step in the advancement of the heavy chemicals industry was taken last year with the opening of a plant in Sindri, Bihar Province, for the production of critically needed chemical fertilizers. Chemical Construction Corp. participated in designing and building the Sindri plant for the Indian government.

Chemical Construction is an important link in American Cyanamid's foreign-operations chain. It has designed and built more than 20% of the world's ammonia plants and is one of the largest designers and builders of ammonium sulfate and sulfuric acid plants.

It is responsible for all of Egypt's chemical fertilizer facilities and more than half of those in India. It has built fertilizer plants for Mexico and the Philippine Islands; sulfuric acid plants for Canada, England, Formosa, and Brazil; urea plants for Japan; sulfur recovery facilities for Colombia; and pickle-liquor recovery plants for the Union of South Africa.

Another major link in American Cyanamid's foreign operations is Lederle Laboratories. Lederle maintains or is building manufacturing facilities in Mexico, Wales, Canada, India, and Japan. In other countries, Lederle has licensed local firms to manufacture its products according to the best methods developed by Lederle research.

Before the pharmaceutical plant opened at Bulsar, India, poverty and dollar restrictions limited consumption of sulfa drugs by India's 250-million people to about one-tenth the volume consumed by America's 160-million. The Bulsar plant will save India hundreds of thousands of dollars in foreign exchange and untold thousands of lives.

One of the company's subsidiaries engaged in foreign operations is Cyanamid Products, Ltd., with headquarters in London. This unit distributes a great number of Cyanamid products and services to Europe, North Africa, Australia, parts of the Middle East, and parts of southeast Asia. The products include vanadium catalyst and pharmaceuticals produced at its plant in Wales.

Another subsidiary, Cyanamid de Mexico, began operating as a distributor in Mexico of mining chemicals, an activity that also embraced a technical assistance program for the mining industry. The subsidiary now distributes many of the parent firm's other products, including agricultural chemicals, dyestuffs and pigments, textile resins, and rubber chemicals.

Subsidiary companies' sales offices overseas are located in Bombay, Buenos Aires, Havana, London, Mexico City, Montreal, San Juan, Toronto, Tokyo, Karachi, Hurtsville (Australia), and Johannesburg.

American Cyanamid's largest foreign operation is in Canada. Known as North American Cyanamid Ltd., it is headquartered at Niagara Falls, where the parent company first began production in 1909. Two plants and large limestone quarries have since been added.

The growth of Cyanamid's foreign operations and that of many other U.S. companies have been impressive. Whether it continues or increases may depend in large part on the progress in solving many of the problems that now retard the flow of investment dollars abroad.

announcing ! ! !

REMINGTON'S NEW *Tropic-Tested*

1954 ROOM AIR CONDITIONERS

Especially developed for the hottest parts of the world

Tropic-Tested and performance proved for more than 16 years in the hottest, most humid climates in the world . . . Acclaimed in 62 countries—thousands in use!

Complete Line of Window and Console Models—all voltages, AC and DC—full rated capacities at 50 or 60 cycles, Air Cooled and Water Cooled in "A size for every room at a price for every purse."

Built By Specialists manufacturing Room Air Conditioners exclusively since 1937—Every unit backed by a definite service plan plus a 5-year warranty on the Hermetic Cooling system . . . your guarantee of quality!

Only Remington Gives you all these features:

- **Exclusive Climate Compensator**—for extra cooling or dehumidifying.
- **New Exclusive Airflo Fresh'ner**—to kill obnoxious odors.
- New Dependable **Electric Heating.**
- New **Variable Velocity Grilles**—Trade wind air motion or gentle zephyr. Most cooling per Horsepower! Most comfort per dollar.

Remington is selecting active distributors for a few choice territories still available:

WRITE: ▶ Factory Export Department MG-2 **REMINGTON AIR CONDITIONING DIVISION**
AUBURN, N. Y., U. S. A. *Cables:* REMINGAIR

specify **HONAN-CRANE**

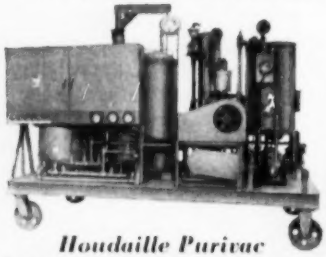
for DEPENDABLE, LOW COST filtration of

HYDRAULIC OILS
TURBINE OILS
DIESEL FUEL & LUBE OILS
METAL WORKING OILS & COOLANTS
QUENCH OILS
INSULATING OILS

Clean oils and coolants mean protection for your equipment against costly shut-downs and repairs often caused by abrasive and corrosive contamination. Increase machine production capacity and lower operating costs in your plant now with one or more Honan-Crane automatic filtration units.

WRITE FOR NEW BULLETIN describing Honan-Crane's complete line of oil filtering and handling equipment.

HONAN-CRANE CORPORATION
26 MADISON AVENUE, LEBANON, INDIANA, U. S. A.
a subsidiary of **HOUDAILLE-HERSHEY CORP.**

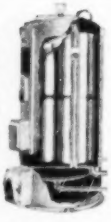


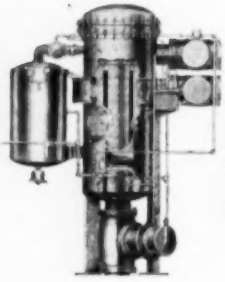
Houdaille Purivac

Purifies, dehydrates and degasifies insulating oil in one automatic operation. Operates in the field (while electrical equipment is in service) or at a central station. Eliminates transformer cleaning, reduces corrosion and deterioration of fabric insulation, restores dielectric strength of oil.

purifiers

Available in many types and sizes to provide needed range in capacity. Use bulk refill or handy, interchangeable cartridges. Remove all types of contamination including dirt, sludge, acids and products of oxidation.





clarifiers

Automatic or mechanical units meet all filtering requirements of small or large central coolant systems. Remove abrasives and other solids from oils and coolants used in grinders, broaches, boring machines, etc.

Why Research?

Research expenditures of the past 10 years produce only a few broad theoretical achievements

U. S. BUSINESS has spent millions cultivating scientific research in the past 10 years. A prodigious quantity of facts and statistics have been developed. Yet, disappointingly, few basic developments in pure science have sprung up. Physicists still labor over Einstein's theories on matter and energy; the economists are still working with Keynes' theories on money and investment. Recently the annual conferences of two scientific organizations confirmed this.

Members of the American Association for the Advancement of Science, meeting in Barton, presented some 1,800 papers under the cover-all title of Scientific Resources for Freedom. Physics in biology formed the basis for four of the most interesting papers.

The liveliest meeting of the American Economic Association in Washington climaxed 18 months of debate on Prof. J. K. Galbraith's theory of countervailing power.

In 1952, Prof. Galbraith of Harvard University published his book, *American Capitalism: the Concept of Countervailing Power*, in which he tried to solve the incongruity between the teachings of present-day classical economics and the realities of the existing American economic structure.

Classic economics states that only a competitive economy can be sound and prosperous, and that competition exists only when the market is not controlled by any single participant. But the fact is that the U. S. economy bears only a remote likeness to the classic picture.

Galbraith claims, however, that the thing that really keeps us on the tracks is countervailing power. It differs from competition in that (1) it is exerted not from the same side of the market, but from the opposite side and (2) it is exerted not by many small units, but by a few large ones.—Business Wk, Jan 9, p90

MANAGEMENT REPORT

U. S. teenagers get a preview of the problems adult business faces through industry-sponsored Junior Achievement companies. Here's how they work: a group of 10 to 15 youngsters raise $100, usually by selling stocks. The $100 goes into setting up a company run by the youngsters. One successful J. A. company is making a profit selling bow ties.

Adults advise on finance, production, and sales. At year end, assets of the teenage company are liquidated. Though most of them are able to pay off stockholders, about 20% fail. The managers of J. A. think, however, that the kids in the companies that fail learn as much about business management as the members of the successful ones.—Business Wk, Dec 26, p30

Have you looked at your drafting costs lately? Like everything else, they are going up. But a cut of 50% is possible. Here's how to do it: simplify your drafting-room procedures and methods. Too many draftsmen are wasting too much time drawing fancy gear teeth, bolt and rivet heads, and other elaborate and repetitive detail.

Simplified drafting can save much of this time by: (1) simplification of delineation, (2) elimination of non-essentials, and (3) extensive use of free-hand drawings and free-hand sketches. That all means leaving off all things that are not needed and doing as much free hand as possible. Other good ideas: progressive dimensioning, not drawing to scale, wider use of templets, lettering by typewriter, and asking, "Is this drawing necessary?"—Prod Eng, 1954 Annual Handbook, A10 & A27

Plenty of ways to cut costs can be developed if plenty of thought is given to the job. Here is an example. Heavy water is expensive to make, so New Zealand is considering the construction of a plant to produce heavy water and electricity by use of geo-thermal steam. Test drillings are now under way to check natural-steam resources. Steam's heat would presumably be an economical means to increase the deuterium concentration in the feed water.—Nucleonics, Jan, p74

Bright, readable signs on Paragon delivery trucks bring in plenty of favorable comments from both new and old customers. This proves to Paragon, an oil company in the New York area, that "truck billboards" pay off. Twenty years ago, Paragon decided that all their trucks represented wasted advertising space. After studying the entire sign field, the company came up with three conclusions: there must be plenty of signs, they must be readable, and they must be easy to wash and keep clean.

So now the average Paragon truck carries seven porcelain signs on each side, plus one on the front and on the back. The letters are large and distinct. To insure maximum visibility, the trucks are painted a bright red and green.—Fleet Owner, Jan, p151

You can raise worker output by replacing group bonus with individual incentive—that is what Seabrook Farms Co. discovered. The company made the change-over on the sorting, packaging and weighing lines. Methods had to be changed to adapt the lines to individual incentive, but the results were worth the changes made. Production rates increased by as much as 50%, and workers' incomes increased proportionately.—Food Eng, Jan, p27

The recent General Motors $40-million holocaust at its Livonia plant has sparked a search for an inexpensive built-up roof that will not pour melted asphalt on the premises during a fire. Already one company, Lexsuco Inc., Cleveland, Ohio, has come up with an answer. Instead of the usual layers of roofing felt mopped to the deck with asphalt, Lexsuco uses its new Lexsucor vinyl vapor seal. This is a specially compounded fire-retardant sheet of 4-mil thickness. Cost runs about 3¢ a sq. ft.

How good is this roof against fire? In a recent demonstration, two test roofs (6x18 ft.) on steel decking were subjected to kerosene-fed flames. The conventional roof with asphalt mopping let asphalt drip through the deck to add to the flames. The deck buckled, exposing the top surface to the flames. In 6 min., the temperature of the slag surface rose from 40 to 475°F. With Lexsucor, roof asphalt did not drip, and buckling of the steel deck was slight. Temperature of the slag never rose above 70°F.—Factory, Jan, p146.

European Machine-Tool Exhibition will be held this year at Milan on Sept 14-23. Unione Costruttori, Italiani Macchine Utensili, one of the four sponsoring trade associations, will organize the exhibition. Heavy participation is expected from Italian, German, and British machine-tool builders. U. S. representation will be greater than at Brussels when 25 American companies exhibited machines.—Am Mach, Dec 21, p87

PRODUCTION IDEAS

from Manufacturers' Catalogs

Large-scale Freeze-drying—The process of drying by sublimation under controlled vacuum conditions — or "freeze-drying"—is discussed in catalog 735. Process is now being applied on the industrial scale to the preservation of food, preparation of pharmaceuticals and biologicals, and the preservation of blood plasma, human tissues, and many serums and vaccines. —F. J. Stokes Machine Co., 5500 Tabor Road, Philadelphia 20, Pa.

Fluid-power Equipment — Bulletin 1051-C illustrates and describes a complete line of fluid-power pumps, motors, transmissions, cylinders, valves. —The Oil Gear Co., 1557A West Pierce St., Milwaukee 4, Wis.

Small Rolling Mills—Bulletin 121 illustrates low-cost, precision-built laboratory and production rolling mills. Construction features of the rolling mills are described.—Stanat Mfg. Co., Long Island City, N. Y.

Magnetic Chucks—Catalog 411 covers entire line of electromagnetic chucks. Chuck sizes, specifications, as well as general information concerning applications and advantages of magnetic chucking are included.—Taft-Pierce Mfg. Co., Woonsocket, Rhode Island.

Preventive Maintenance Control — "Successful Preventive Maintenance for Plant and Manufacturing Equipment" tells you how to set up a control system for servicing your machines.— Remington Rand Inc., International Div., Dept. 9646, 315 Fourth Ave., New York 10, N. Y.

Gaging Cartridges—"Plunjet" gaging cartridges extend usefulness and flexibility of air-gage equipment. Complete information is given in catalog. —Sheffield Corp., Dayton 1, Ohio

Winches and Car Pullers—Two bulletins describe company's line of hand and motor winches and car pullers. Specifications are given in bulletins 853 and 753.—Stephens-Adamson Mfg. Co., Aurora, Ill.

Fluid Drives—Wide range of variable-speed fluid drives is discussed in catalog 9319. Capacities available range from 100 to 2,500 hp.—American Blower Corp., Detroit 32, Mich.

Petroleum Refinery—Booklet "Lummus at Cardon" describes problems encountered and how they were solved when company built a petroleum refinery in Venezuela.—Lummus Co., 385 Madison Ave., New York 17, N. Y.

For Safer Air—Description of catalytic exhaust that eliminates dangerous carbon-monoxide fumes and odors from all types of gasoline-powered equipment is given in pamphlet "OCM Catalytic Exhaust." — Oxy-Catalyst, Inc., Wayne, Pa.

Refrigeration Products—Complete line of products for commercial refrigeration and air-conditioning installations is covered in catalog R-153. Company has long experience in making valves, driers, strainers, fittings, and accessories.—Mueller Brass Co., Port Huron, Mich.

Hydroelectric Plants—Booklet EXTO-1/02 describes generators and switchgear equipment for hydroelectric plants. There is also a general discussion of hydroelectric power generation.—Allgemeine Elektricitats-Gesellschaft, Export Dept., Frankfurt (Main), Germany

Electric Clutch Control—How to speed production and maintain operator safety with power presses is demonstrated in booklet 59. Clutch control through micro switches does the trick. Minneapolis-Honeywell Regulator Co., International Div., 2747 Fourth Ave. S, Minneapolis 8, Minn.

Meter-socket Selection—Booklet GEA-5878 tells you all you need to know to do a good job in selecting watthour-meter sockets for all applications.— International General Electric Co., 570 Lexington Ave., New York 22, N. Y.

Versatile Earthmover—Catalog 1235 describes machine that will do excavator-crane work as well as bulldozing and other tractor service.—Hyster Co., 2902–64 N. E. Clackamas St., Portland 8, Ore.

For Screening Needs—Three bulletins describe company's line of vibrating screens. Three types of screens are available: (1) moderate to heavy-duty screening of fine to coarse materials, (2) sizing medium to fine materials, and (3) wet and dry screening, rinsing, dewatering of fine to coarse materials. Write for bulletins 6151B, B6099, 6330.—Allis-Chalmers Mfg. Co., General Mach. Div., Exp. Dept., Milwaukee 1, Wis.

About Glass—Illustrated booklet tells you about glass and how it might help your business. It is called "GLASS, its increasing importance in product design."—Corning Glass Works, Export Dept. G2, 718 Fifth Ave., New York 19, N. Y.

Outboard Propulsion — Catalog describes marine outboard power units, called Harbormaster Units, which provide extreme maneuverability and heavy-duty power. Units can be installed on most barges, scows, towboats, tugs, derricks, and lighters.— Murray & Tregurtha, Inc., 22 Hancock St., Quincy 71, Mass.

Boring and Facing Machines—Two basic types of bar horizontal boring and facing machines are described and illustrated. Ask for Simmons 6-in. and 8-in. bar horizontal boring and facing machines folder.—Simmons Machine Tool Corp., Export Div., 50 E. 42nd St., New York 17, N. Y.

Power-plant Refractories—Booklet 2301-1PEMX can help you in selecting the proper refractory products for critical areas in boilers for heat and power.—Norton Behr-Manning Overseas Inc., Worcester 6, Mass.

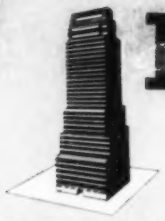
Single-stage Turbine—Design features and performance data of new single-stage turbine are covered in bulletin 4206. Maximum operating conditions of turbine are: 100 hp., 300-lb.-per-sq.-in. gage, 550°F. temperature, and 400-rpm. speed.—De-Laval Steam Turbine Co., Trenton 2, New Jersey

Packaged Drives—Packaged adjustable-voltage drives for variable speed applications are discussed in booklet B-5808.—Westinghouse Electric International Co., 40 Wall Street, New York 5, N. Y.

Precision Barrel Finishing — Compounds for descaling, deburring, abrasive cut-down, non-abrasive cut-down, finishing, coloring, burnishing, metal cleaning, and rust inhibiting are covered in bulletin LCC-531.—Lord Chemical Corp., 2068 S. Queen St., York 9, Pa.

Please write directly . . .

. . . to the manufacturers for the free literature announced on this page. Tell them definitely which catalog you want—specify the catalog number or its name when either one is given. And mention that you saw the offer in the McGraw-Hill Digest.



McGraw Hill Books

for business and industry

Start a Business Library Today!

These books can help you cut maintenance costs, increase operating efficiency, and improve production.

1. **Black and Piccoli—SUCCESSFUL LABOR RELATIONS FOR SMALL BUSINESS, 425 pages, 1953 . . . . . $6.75**
   Written to present practical guidance in handling labor relations in small business or industry, this book shows the principles and techniques used to secure better contracts and to avoid or clear up labor disturbances.

2. **Stephenson and Pratzner — PUBLICITY FOR PRESTIGE AND PROFIT, 304 pages, 1953 $5.00**
   A readable survey and manual of all phases of public relations. Methods and techniques of building prestige through publicity are explained in detail.

3. **Hadley Editorial Staff — PAYROLL RECORD KEEPING (Precision Air Parts Company Practice Set), 1953 Edition. Including Practice Assignments and Laboratory Material $1.50**
   This is a complete, up-to-date revision of a successful practice set which may be used with any text in courses on secretarial accounting or bookkeeping.

4. **Henrici—STANDARD COSTS FOR MANUFACTURING, 2/ed., 336 pages, 1953 . . . . . $6.25**
   This new book presents all data—benefits, types of expense recording, how standard-cost systems work, standardization of factory operations and the setting of standard costs for these operations, ways of using standard costs—necessary for installation and operation of standard-cost systems.

5. **Scott, Clothier, and Spriegel—Personnel Management, 5/ed., 685 pages, 1954 . . . . . $7.25**
   This inclusive revision of a very popular personnel management textbook portrays the most modern personnel management practices and the philosophy which underlies them. The treatment is clear, psychologically complete, and is based on the authors' survey of current practices in 629 leading companies.

6. **Loberg — MACHINE TOOL SELLING, 2/ed., 194 pages, 1953 . . . . . $5.75**
   This new book surveys the entire field of machine tool selling, and presents problems and proved sales-building methods that will improve techniques and increase sales.

7. **Shultz and Coleman — LABOR PROBLEMS: Cases and Readings, 456 pages, 1953 . . . $5.00**
   This collection of case materials and supplementary readings covers unions, management, collective bargaining, and public policy. The treatment provides divergent points of view on major issues and familiarizes the reader with the actual situations which give rise to labor problems.

8. **Thompson—POPULATION PROBLEMS, 4/ed., 467 pages, 1953 . . . . . $7.25**
   This treatment provides an up-to-date, nontechnical discussion of matters of general interest relating to the growth and change of population. Emphasis is on the meaning of population changes and trends in population developments.

9. **Rosin and Eastman—THE ROAD TO ABUNDANCE, 167 pages, 1953 . . . . . $4.00**
   This provocative new book provides modern chemistry's answer to those who claim the earth's natural resources are being depleted too quickly. The authors demonstrate that chemical research and manufacture, properly encouraged, can assure a future of absolute abundance.

10. **Hadley Editorial Staff—COST ACCOUNTING, 245 pages, 1953 . . . . . $4.00**
    A one-semester program designed to follow any first-year course in accounting. The material provides thorough training in the basic variations—job cost, process cost, and standard cost. An up-to-date discussion of estimate costs, accounting for by-products, and distribution costs is included.

These books may be ordered by using the coupon below, accompanied by full remittance in U.S. dollars. We will be glad to send you additional information on these and other McGraw-Hill books upon request.

CLIP HERE

Book Department
McGRAW-HILL DIGEST
330 West 42nd Street
New York 36, N. Y., U. S. A.

Please send me the books corresponding to the numbers circled opposite, via registered book post. I understand that the prices quoted include postage and registration. I am enclosing U. S. $. . . . . .

1. 2. 3. 4. 5.
6. 7. 8. 9. 10.

Name . . . . . .
Address . . . . . .
City . . . . . .
Country . . . . . .

To insure proper handling please type or print

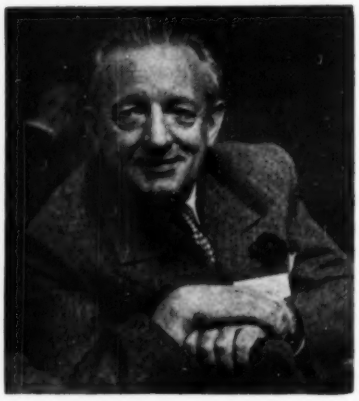
D-3-54

Here's Another Magazine We Digest

Western Electrification

ELECTRICAL WEST, now in its 67th year, serves the most highly electrified region of the United States. Certain basic differences between the Far West and the rest of the U. S. gave it its genesis; geographic isolation, climatic differences, natural resources, individuality of thinking, and pioneering spirit are some of them.

Certain specific electrical influences merit specialized editorial attention in *Electrical West* that is not possible in national or international magazines. Hydroelectric power predominates in the region (75% of the total generated), and high-head developments are commonplace. Fuel power is largely produced with oil or natural gas. Transmission distances are long, and high-voltage transmission has been pioneered in the West. So have system interconnection and pooled system operation. Per-capita electrical usage is nearly twice the national average, and annual domestic consumptions in excess of 6,000 kw.-hr. are common. Rural electrification had its start in the region and today tops the nation. Cooperative electrical marketing techniques and promotion of adequate residential wiring have been developed to a high degree.



George C. Tenney
Editor, Electrical West

These factors emphasize the regional nature of problems in sales, engineering, operation, and construction, as well as in electrical applications of all kinds. They form the basis for the editorial program. The content appeals to executives and engineers in utility organizations, electrical contractors, wholesalers, and manufacturers or allied electrical businesses.

Four editors, two of them electrical engineers and a third a construction and merchandising specialist, travel 50,000 miles a year in the West in order to make the magazine the home-town monthly of this fast-growing and highly developed area of electrification.

ADVERTISERS IN THIS ISSUE

ALLIS-CHALMERS MANUFACTURING CO., General Machinery Div. 40
ALLIS-CHALMERS MANUFACTURING CO., Tractor Div. 1
AMERICAN CYANAMID CO. 4th Cover
BETHLEHEM STEEL EXPORT CORP. 4
BLAW-KNOX CO. 15
BLISS CO., E. W. 5
BURROUGHS CORP. 2nd Cover
CANADIAN INTL. TRADE FAIR 22
DELORO SMELTING & REFINING CO., LTD. 38
EX-CELL-O CORPORATION 39
GLOBE HOIST CO. 33
HITACHI, LTD. 6
HONAN-CRANE CORP. 44
HOUGH CO., FRANK G. 8
LINK-BELT CO. 2, 3
MASCHINENFABRIK AUGSBURG NURNBERG AG. 10
McGRAW-HILL DIGEST 47
NORDBERG MANUFACTURING CO. 3rd Cover
PRESSED STEEL CAR CO., INC. 30
REMINGTON CORP. 44
TOLEDO SCALE CO. 34
UNDERWOOD CORP. 21
VICTOR SAW WORKS, INC. 27
WALLACE & TIERNAN CO., INC. 28
WATSON-STILLMAN CO. 18
WILLYS-OVERLAND EXPORT CORP. 24, 25

Publications Digested:

McGraw-Hill Publishing Co., Inc.,
330 W. 42nd St., New York 36, N. Y.
American Machinist
Aviation Week
Bus Transportation
Business Week
Chemical Engineering
Chemical Week
Coal Age
Construction Methods & Equipment
Electrical Construction & Maintenance
Electrical Merchandising
Electrical West
Electrical Wholesaling
Electrical World
Electronics
Engineering & Mining Journal
E&MJ Metal & Mineral Markets
Engineering News-Record
Factory Management & Maintenance
Fleet Owner
Food Engineering
Industrial Distribution
Machinist (London Office)
National Petroleum News
Nucleonics
Petroleum Processing
Pharmacy International
Power
Product Engineering
Textile World
The American Automobile (Overseas Edition)
The Welding Engineer

Chilton Company,
Chestnut and 56th St., Philadelphia 39, Pa.
Automotive Industries
Boot & Shoe Recorder
Hardware Age
The Iron Age
The Optical Journal & Review of Optometry

Dartnell Publications, Inc.,
4660 Ravenswood Ave., Chicago 40, Ill.
American Business

Fritz Publications, Inc.,
431 S. Dearborn St., Chicago 5, Ill.
The Paper Industry

Industrial Publications, Inc.,
5 South Wabash Ave., Chicago 3, Ill.
Ceramic Industry

Modern Packaging Corp.,
575 Madison Ave., New York 22, N. Y.
Modern Packaging

Modern Plastics, Inc.,
575 Madison Ave., New York 22, N. Y.
Modern Plastics

Petroleum Publishing Co.,
211 S. Cheyenne Ave., Tulsa 1, Okla.
The Oil and Gas Journal

Simmons-Boardman Publishing Corp.,
30 Church St., New York 17, N. Y.
American Builder
Marine Engineering
Railway Age
Track and Structures
Locomotives and Cars
Railway Signaling & Communications

McGraw-Hill World News Bureaus: *London, Paris, Frankfurt, Tokyo, Bombay, Melbourne, Mexico City, Sao Paulo, Stockholm, Manila, Madrid, Tel Aviv, Rome, Ottawa, Belgrade, Tehran, Helsinki, Athens, Brussels, Copenhagen, Wellington, and 30 other industrial cities.*

behind this name . . .

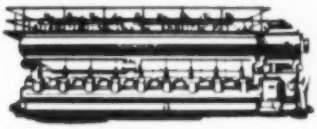
NORDBERG

engine building experience and service *Second to None*

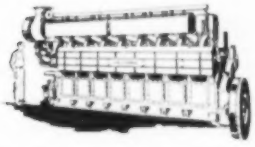
For over a half century, Nordberg has been solving power problems efficiently and economically the world over. The acquisition of the Busch-Sulzer Bros. Diesel Engine Co., now a division of Nordberg, combines America's *first* builder of Diesel engines with the builder of America's *largest* line of heavy duty Diesel engines . . . in sizes from 10 to over 10,000 horsepower.

This unequalled engine building experience is your assurance that the finest in technical and practical ability, together with an outstanding service reputation, stands behind every Nordberg stationary and marine engine installation.

Nordberg builds both two-cycle and four-cycle engines, including Diesel, Gas and Duafuel® types. With the extremely wide range of sizes and types to choose from you are assured of the right engine to meet each specific power application. Write for further information, outlining your power requirements.

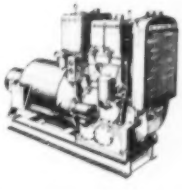


Nordberg 2-cycle Diesels are built in sizes from 1570 to 10,800 H.P. Two-cycle Duafuel® engines are built in sizes from 1570 H.P. upward. They operate on gas or fuel oil, or any combination of both—and are instantly changed over from one fuel to another, without changing speed or load.



Nordberg 4-cycle *SUPAIRTHERMAL* Engines are available for Diesel, Duafuel® or spark-fired gas operation, in sizes from 535 to 4260 H.P. Other 4-cycle models available from 220 H.P. upwards.

Nordberg 2-cycle Radial engines develop 1950 to 2125 H.P. or 1250 to 1500 K.W. at 400 R.P.M., as oil burning Diesels, as spark-fired gas engines, and as Duafuel® engines.



Nordberg "4FS" Diesel engines are built in 1, 2 and 3-cylinder sizes for generating electricity, pumping and straight power applications. These "packaged" power units develop from 10 to 45 H.P. or 6 to 30 K.W.

NORDBERG MFG. CO., Milwaukee, Wisconsin, U.S.A. CABLE ADDRESS: *NORDBERG*

LONDON	JOHANNESBURG	MEXICO, D.F.
19 Curzon St., W.1.	42 Marshall Street	Dolores 3

NORDBERG THE WORLD OVER

Dealers in Principal Trading Areas throughout the World

XD154

Cyanamid materials for more versatile, attractive plastics

Today's plastics owe many of their useful properties to Cyanamid's intensive research in the field. Many new resins, molding compounds and other materials for the plastics industry were first supplied by Cyanamid.

A complete line of resins, plasticizers, and other plastics specialities is always available from Cyanamid.

Included in the complete Cyanamid line are:

- Molding compounds—thermosetting melamine and urea-formaldehyde types
- Laminating resins—thermosetting polyester and melamine types
- Thermosetting adhesives—for plywood, fibreboard and furniture bonding
- Pigments—Dyes
- Lubricants and Stabilizers—metallic stearates for mold dusting, internal lubrication, stabilizing vinyl plastics
- Plasticizers

Write for complete information on any of these Cyanamid products for the plastics industry.

AMERICAN *Cyanamid* COMPANY

30 Rockefeller Plaza, New York 20, N. Y.

Representatives Throughout the World

Products are not offered in countries where adversely-controlled patent rights exist.